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A

PRACTICAL TREATISE

ON

FEVERS.

By Dr. STEVENS.

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PREFACE.

WHEN any Perſon would aſpire to be acquainted with the wonderful Works of Nature, he muſt begin with giving an unwearied Attendance upon all her Operations and Motions; he ſhould conſtantly attach himſelf to obſerve all the Phænomena from thence ariſing, till he has collected together ſuch a Number of Obſervations, as will give him a clear Inſight into the Nature and Cauſe of theſe Operations and Motions, and from thence he will be able to eſtabliſh the general Laws of Matter and Motion.

From the Knowledge of theſe Laws it is that Medicine, and, in ſhort, all other Arts may be brought to their wiſhed-for Perfection, i. e. *as far as human Nature is capable of bringing them, the true Cauſes of Diſeaſes diſcovered, and the exact Method of relieving thoſe Diſeaſes according to their Cauſes. But Studies of this Kind have been very much neglected in all the Sciences, but more particularly in Medicine; and Phyſicians have betaken themſelves to Studies of a different Nature, to diſcover the Cauſes of Diſeaſes and the Operation of Medicines; ſome follow-*

ing the ridiculous Whims of Ariſtotle, *others thoſe of* Paracelſus, Van Helmont, *and others of that Tribe; many again have attributed the Cauſes of Diſeaſes, and the Operation of Medicines, to ſome ſpecific or occult Quality contained within them; and ſome others have, from Chemical Principles, endeavoured to ſupport their Hypotheſis; nay, there are various other hypothetic Whims which Phyſicians have introduced into Medicine to account for the Nature and Cauſes of Diſeaſes, and which are too tedious to be inſerted here; all which, though they bear no Reſemblance to Truth, yet, as they are writ by Men of Character, and thoſe of no ſmall Share of Rhetoric, their Manner of Writing, and Ideas, were imbibed by ſome of the unthinking Part of Mankind, to the no ſmall Detriment of this moſt noble Art; as their Structure was built upon a ſandy Foundation, and conſequently ſubject to the ſmalleſt Storm. On the contrary, if they had, previous to their Study of the Practice of Medicine, ſtudied,*

Firſt, The Laws of Matter and Motion.

Secondly, The Make, Structure, and Compoſition of the human Body.

Thirdly, The Method of applying theſe Laws to the Body, the moſt finiſhed Fabric upon

upon Earth, and thereby to diſcover how each Part and Fibre of the ſame is ſet in Action, continued and regulated therein, and what Cauſes are ſufficient to weaken or retard the ſame, they would have built their Structure upon a ſolid Foundation, a Foundation upon which a Stucture might be built ſo as to bring Medicine to its wiſhed for Perfection.

It is an Obſervation of the great Boyle's, *and I think a very juſt one, that if a Phyſician cannot account how Heat and Cold, Fluidity and Solidity, Fermentation, Putrefaction, Viſcoſity, Coagulation, Diſſolution, &c. are generated and deſtroyed in Bodies, it will be impoſſible for him to find out the Cauſes of Diſeaſes; as they all depend upon the Change of theſe or the like Qualities. And on the contrary, when a Phyſician is acquainted with theſe Laws of Matter and Motion, and the different Ways whereby they may produce their Effects, he therefore is able to account for the Operations of Nature, the Cauſes and Effects of Diſeaſes, and to point out the Means whereby they may be relieved. Whereas, on the other Hand, when a Phyſician is unacquainted with the Cauſes of Diſeaſes, he cannot poſſibly exhibit proper Remedies always (although the Medicine may ſometimes have its deſired Effect, by* *mere Chance) and the poor Patient muſt ſuffer through the Phyſician's Ignorance.*

There is another Obſervation of the great Boyle, *and certainly equally true with the former, that the many Deficiencies in the Reaſoning of Philoſophers, ariſe from their having too precipitately, and without a ſufficient Number of Experiments, preſumed to deliver Axioms, and eſtabliſh general Rules. For it is certain that a Theory, which is founded upon only a ſuperficial Enquiry into the Operations of Nature, muſt be entirely overthrown when a more ſolid Enquiry is made.*

As we have already obſerved, that, to underſtand rightly the Laws of Matter and Motion, is the only Means by which a thorough Knowledge of the Operations of Nature can be obtained, we ſhall next obſerve that there are ſeveral Phænomena, which are the Effects of theſe, that will be very neceſſary to be underſtood by all Practitioners of Medicine, as theſe prove to an ocular Demonſtration the Effects of thoſe Laws.

The firſt of theſe are the Mechanic Powers: And certainly every Phyſician ſhould be acquainted with theſe, before he can pretend to diſcover the Structure of an Animal Body, the Motion of the Muſcles, and to give a rational Account of the Weight they are capable of raiſing, or is equivalent to the Force they exert.

The ſecond of theſe is the Doctrine of Hydroſtratics and Hydraulics; for by theſe are all the Laws and Motions of the Animal Fluids underſtood; as the increaſed or decreaſed Velocity of the Circulation, and its Velocity in the different Series of Veſſels through which it is received; the Contents of the Arteries running through a decreaſing Series of Veſſels, and the Contents of the Veins through an increaſing Series, with the curious Apparatus of Animal Secretion: without the Knowledge of which, a Phyſician muſt be entirely ignorant of the moſt curious and uſeful Phænomena.

The third of theſe is Chemiſtry; which, according to the learned Boerhaave, *is the only Means by which ſpeculative Philoſophy is rendered practical, and which the great* Bacon *ſays is Philoſophy in Action, as it proves to ocular Demonſtration, the different Effects of Rarefaction, Fermentation, Diſſolution, Concretion, Sublimation, Cryſtallization, Precipitation, and moſt of the Phænomena of Nature. By this we diſcover the Nature and conſtituent Parts of all Bodies or Maſſes of Matter; by this we may diſcover the Nature of the Particles which compoſe the ſolid or fluid Parts of our Bodies, the different Degrees of attractive Force with which they are connected together, and the different Degrees*

grees of Heat or Motion which will increaſe or decreaſe their attractive Force, and the Effects which will be produced thereby.

The fourth of theſe is Pharmacy, to which we may add Botany; and theſe are what no good Practitioner of Medicine ſhould be ignorant of; for the Knowledge of Vegetables, and the Knowledge of rightly preparing, and underſtanding the Goodneſs of Medicines, are Things ſo eſſential to the Practice of Phyſick, that thoſe who are ignorant of the ſame ſhould rather be called Mountebanks than Phyſicians.

After a Phyſician is acquainted with the Laws of Matter and Motion, and thoſe Phænomena we have juſt now mentioned; his next Study ſhould be to make Obſervations upon the Effects of the Diſeaſes of the human Body; and the Means by which Nature, unaſſiſted, gets the better of her Ail; and what Efforts ſhe makes to relieve herſelf. And by a Number of ſuch Obſervations, and the Application of theſe Laws to them, he cannot fail of finding out the true Cauſe of thoſe Effects, and the Method of relieving them, and of being a happy, ſafe, and unnerring Practitioner.

But when any Perſon, who would ſtudy Phyſick, neglects the Method we have propoſed, and purſues his Study by heaping together

gether a great Number of Medicines for all Diſeaſes, which he thinks ſhall operate by their ſpecific, or occult Quality, ſuch a Perſon (we ſhall not call him a Phyſician) although ever ſo regularly bred, ſoon becomes a a Diſhonour to the Practice of Medicine.

But let me tell thoſe Favourers of Specifics, and Medicines which operate by an occult Quality, that there never did, nor ever can, exiſt any ſuch Thing, as Nature now ſtands conſtituted.

I am very certain that this Doctrine of ſpecific and occult Qualities has covered more Ignorance, and recommended more Fools, than any one Thing in the World beſides; eſpecially if we add to it the Term malignant.

Thus having pointed out the Qualifications of a Phyſician, and the Qualifications of a ſpecific Doctor, or an Empiric; we ſhall now proceed to inform the judicious Reader of the Contents of the following Work.

And Firſt, We have pointed out the general Laws of Matter and Motion, as we have been able to trace them, both from Experiments, and the Obſervations of the greateſt Naturaliſts of all Ages.

Secondly, We have applied theſe Laws to the animal Body, and by them have endeavoured, to account for the various Operations of Nature, to point out the true Cauſes of the Diſeaſes *caſes we have treated of, to lay down the Method of relieving them, and to account for the Operations of the Medicines by which they are relieved.*

This we have endeavoured to do in the plaineſt Manner poſſible, carefully avoiding all the abſurd Notions we have before taken Notice of, and inſtituting in their Room a Practice which is founded upon juſt Principles and Obſervations.

CONTENTS of CHAPTERS

I. Containing the general Laws of Matter and Motion PAGE 15
II. Of Animal Secretion 71
III. Of the State of the Solids generally cauſing Fevers 189
IV. Of the general State of the Fluids cauſing Fevers 207
V. Of a ſimple continued inflammatory Fever 223
VI. Of an acute continual inflammatory Fever 299
VII. Of intermitting Fevers 285
VIII. Of putrid Fevers, commonly called malignant 317
X. Of the ſlow depreſſing Fever, commonly called the nervous Fever 355
XI. Of the Small-Pox 385
XII. Of a Pleuriſy 452
XIII. Of the Peripneumony 473
XIV. Of the putrid Peripneumony 500

A TREA-

THE INTRODUCTION.

I AM very well apprized of the Danger I run, in venturing to write upon this Subject, when ſo many eminent Men of the Profeſſion have already undertaken it. But the Reaſon I ſhall offer in my Defence, is, the little Satisfaction I could meet with from any of their Performances.

I CANNOT be apprehenſive of giving a Diſtaſte to any Perſon, in taking the Freedom, unbiaſſed by Favour or Prejudice, to inform the World how it comes about, that Medicine has baffled the painful and elaborate Enquiries of the moſt eminent Practitioners, from the great *Hippocrates* down to our preſent Time; and by what Means it is to be raiſed to its wiſhed for Perfection, ſo far as the Life of the human Species is capable of being preſerved by Art.

WHEN thoſe who profeſs Phyſic and Philoſophy, or indeed any other Kind of Learning, would be eſteemed Omniſcient, tho' they know not the true Cauſes of the Phænomena they have treated on, they generally have Recourſe to hard Terms, which they ſubſtitute as expreſſive of Cauſes they would have us believe they underſtand; tho' in truth they underſtand them no more than thoſe on whom they would impoſe them: And hence ariſes a mere wordy Science, which can only be regarded as the Aſylum of Pride and Ignorance.

And thus we have been impoſed on by the Ignorance and Impudence of thoſe, who would make us believe Darkneſs is Light, Bitter is Sweet, and Folly Wiſdom; and all this to obtain a little of the Reverence, Admiration, and Wealth, of this tranſitory World. And therefore ſuch Men take it ill to be preſſed for a clear Definition, or Explanation of ſuch Terms; and are angry unleſs we can be content with an Explanation of obſcure Terms, by others equally dark and obſcure.

From hence aroſe the plentiful Stock of Railing that we find in ſuch Authors, who are preſſed to give us clear Ideas and ſuitable Explications of ſuch favourite Terms; eſpecially when ſuch have laid up, or hope to acquire, a conſiderable Share of Reputation or Profit, upon ſuch baſeleſs Foundations. Hence we hear ſo much of different Opinions, and abundant Railing among Phyſicians, Philoſophers, and Profeſſors of every Kind of Science. And thus they have gone on deceiving themſelves, and others who are their Followers. This Paſſion, this Blindneſs, for the Honour of great Names, and not judging for ourſelves is prepoſterous, and none of the leaſt among the Cauſes of that Darkneſs and Obſcurity, which, at this Day, attend medicinal Enquiries.

To ſpeak freely then, it appears to me, that the medicinal Art is of greater Antiquity than the Study of Philoſophy; becauſe when the human Species firſt began to uſe Medicine or Philoſophy, as they were determined by their Regards either to the Body or Mind; the Reaſons for the former they found perpetual, but for the latter only fortuitous and accidental: For they who in the beginning inhabited the Earth, lived firſt on Vegetables, expoſed to the Irregularities of the Atmoſphere; that is, they ailed before they provided themſelves with proper Materials to guard againſt thoſe Irregularities; as Houſes and Cloathing: Thoſe were the firſt Grievances they found, and theſe their firſt Remedies. But when theſe Remedies proved ineffectual to relieve their Grievances, they were under a Neceſſity to have Recourſe to the Art of Phyſic; and whoſoever found out Relief for them, were accounted Benefactors to the Community. But Men began not to uſe Philoſophy, till they had experienced the Operations of Remedies, and made an effectual Search into the Nature of Things.

But in thoſe Days Men attributed their Diſeaſes to the Anger of the Gods; and Aſtronomy being the firſt Science that was cultivated by thoſe who profeſſed Philoſophy, as the Names of the Gods were in thoſe Ages affixed to particular Stars; therefore, it is very probable, that the firſt Phyſicians began their Enquiries into thoſe Diſeaſes which attended upon the Alterations of Seaſons, and the Motions of the Sun, Moon, and Stars, which the greateſt Part of the World in thoſe Days looked on as their Gods, and on whom all ſublunary Beings depended. Hence aroſe that confuſed Heap of Nonſenſe called Judicial Aſtrology, which in former Ages was thought to be the nobleſt Science that was cultivated amongſt Men, and kept the thinking Part of Mankind from ſearching into the true Laws of natural Bodies, Medicine, *&c.* becauſe they thought all theſe were governed by the Influence of the heavenly Bodies, and to ſtudy their Motions and Aſpects was all that Man was capable of doing. From this Sprung the Doctrine of occult Qualities, Sympathies, Antipathies, malignant Diſeaſes, ſpecific

Medicines, *&c.* and I am ſorry to add, that a great deal of ſuch empty Notions are countenanced by Men of Learning to this Day. Theſe, with the Jargon of *Ariſtotle*, the Nonſenſe of *Paracelſus* and *Van Helmont*, and our School-Bigotry, have hitherto greatly contributed to prevent Men of Genius from diſcovering the true Cauſes of Diſeaſes, and the Effects of Medicines.

ALL the World will allow, that it is not juſt to deliver any thing as a Truth, either in the Theory or Practice of Medicine, concerning which we are more uncertain than any Man would chooſe to be in a Point of Conſequence relating to his ordinary Affairs: For the Care of our Bodies ought to exceed that of our Eſtates. Hence it follows, that it is not juſt to advance any thing in the Theory or Practice of Medicine, but what is founded upon the genuine Laws of Matter and Motion, which are the Laws by which all material Bodies are governed, and by which the Practice of Medicine may be brought to its greateſt Perfection. From whence we may juſtly conclude, that theſe Notions of occult Qualities, malignant Diſeaſes, ſpecific Medicines, *&c.* delivered down to us by ſome of the Antients, and the Nonſenſe, Pride, and Bigotry of the Moderns, are the true Reaſons that Medicine has baffled the painful and elaborate Enquiries of ſome of the greateſt Practitioners to this Day.

IT is much to be wiſhed our Forefathers in Medicine had confined their Practice to Bleeding, giving a common Purge, and diluting, rather than have grafted a Science upon Conjecture and erroneous Opinions, which are as oppoſite to Truth as the Eaſt is from the Weſt. By this their Nonſenſe it is, that all their Deſcendants have been groveling in a State of Darkneſs and Obſcurity,

ſcurity, and that Medicine falls ſhort of its wiſhed for Perfection; and that long ſince it has ſtood condemned to Uncertainty, by thoſe who do not conſider that its Errors are not in the Art, but in its Profeſſors: For after many had been wearied out with thoſe Diſputes, which this abſurd Syſtem had for a long Courſe of Time ſtirred up, and had found the Evil increaſe rather than admit of any Remedy, by a common Defection of Practitioners into the current Syſtem of Errors, they were eaſily induced to throw off all Regard to Perſons ſo much involved in Uncertainty and Contradiction. And this is what has rendered this Art unimproved for many Ages: This is the Stumbling-block which we ſhould be very careful to avoid, in order to judge rightly of the Operations of Nature, and if we would ſhun the Imputation of being Slaves to Opinion.

Certainly it does not ſuit that Art, which alone preſides over the Health of the human Species, to be encumbered with the Conjectures, and baſeleſs Notions of Diſputants; for no Man of common Senſe would commit the Care of his Life to one, who adminiſtered Medicines and did not know the Manner of their Operation, but imputed it to ſome occult or ſpecific Quality. But it behoves every good Phyſician to caſt off all this Jargon and groundleſs Syſtem, and to ſtudy Nature according to her genuine Laws, by which his Structure will be laid on a ſolid Foundation; and whatever he builds will ſtand the Teſt of future Ages, and the Darts of Ignorance will not prevail againſt it.

Whosoever conſiders with an unprejudiced Mind what we have already ſaid, will allow, that nothing ought to be advanced into a Principle in Medicine, which is not upon an equal Certainty with the Objects of Senſation: As Certainty is of the laſt Conſequence in a Science which is by no means a Matter of Curioſity, but on the contrary affects the Health and Life of the human Species.

THE State of Darkneſs and Obſcurity that Medicine was in, in former Ages, may be ſome Excuſe for their ill Succeſs; but what Excuſe the preſent Age can have I know not; for I find but very little Improvement therein more than our Predeceſſors could boaſt of, notwithſtanding ſo many additional Aſſiſtances from Botany, Anatomy, Chymiſtry, and, above all, the Knowledge of the genuine Laws of Nature, upon which all our Structures ought to be built.

I HAVE often admired and wondered, that ſo many learned and ingenious Men, as they thought themſelves, could not point out that Block upon which all have ſtumbled, deſtroy that Structure which is built upon a ſandy Foundation, and lay a Foundation for a Structure, which ſhall endure till Time ſhall be no more. Indeed ſome of our modern Phyſicians have rejected the Notion of occult Qualities and the aſtral Influences; but they have ſtill retained the Notion that all the Medicines, which they find effectual in removing any Diſeaſe incident to human Bodies, have ſpecific Qualities, and all the Diſeaſes they are not acquainted with, they call Malignant; and many more ſuch ridiculous Notions.

It remains, therefore, that we reject all thoſe Notions with Contempt, and found the Syſtem, that we ſhall advance, upon the genuine Laws of Matter and

Motion, by which all Nature is known to be governed, and which Experience teaches us is the only Means of laying a ſolid Foundation to build upon.

A
PRACTICAL TREATISE
ON
FEVERS.

CHAP. I.

Containing the General Laws of Matter and Motion:

PROP. I.

All Bodies continue in their State of Reſt, or Motion uniformly in a tangent Line, excepting they are obliged to change that State of Reſt, or Motion, by Forces impreſs'd.

WE ſee all Bodies, by their Nature, are inactive and incapable of moving themſelves; wherefore, unleſs they be moved by a Force ſuperior to their repelling Force, they muſt neceſſarily remain for ever at Reſt. This may be proved by daily Experience; for when any Body is ſet in Motion, it continues to move in the ſame Direction, and with the ſame Velocity; until the Power of its own Gravity, the Reſiſtance of the Air, the Figure of the Body, or ſome other external Cauſe, determines it from its tangent-line Direction, decreaſes its Velocity, and at laſt brings it to a State of Reſt: But in a perfect Vacuum there is nothing of this Kind, therefore, in a Vacuum, Motion muſt of Neceſſity be perpetual.

PROP. II.

All Change of Motion is in proportion to the Power of the moving Force impreſſed; and is always made according to the ſame Direction in which that Force is impreſſed.

FROM whence we may obſerve, that if any Power produceth any Quantity of Motion; another Power which is double, treble, &c. will produce a double, treble, &c. Quantity of Motion; whether it be impreſſed together or at different Times: And this Motion is added to the Motion of a Body in the ſame Direction by Impact, and it will move ſo much the quicker in Proportion to its Quantity; but it is ſubſtracted from the Motion of a Body in contrary Direction, and therefore that Body will move ſo much the ſlower. It is alſo obliquely joined to the Motion of a

Body obliquely moving; and will be compounded with it according to the Determination of both. From whence we may plainly obſerve, that, as Nature now ſtands conſtituted, there can be no ſuch Thing as perpetual Motion; for, according to our Propoſition, the Motion produced is but proportional to the generating Force, and all Motions on our Globe being performed in a reſiſting Medium, *viz.* the Atmoſphere, a conſiderable Quantity of the Motion muſt, in the Communication, be ſpent on this Medium; and conſequently the ſame Quantity cannot return undiminiſhed upon the firſt Mover, which is abſolutely neceſſary for a perpetual Motion.

PROP. III.

The Repulſe, or Re-action, of two Bodies is always equal, and in contrary Direction, to Impulſe, or Action, i. e. *the Action of two Bodies is always equal in contrary Directions.*

If we preſs any heavy Body downward with our Feet, that heavy Body equally preſſes our Feet again upward: Or if a Stone falls toward the Earth, it attracts the Earth as much as the Earth attracts it, in Proportion to the Quantity of Matter in each: The Steel draws the Magnet as much as the Magnet draws the Steel; as is evident by making both ſwim in Water. And when a human Body is in perfect Health, the Fluids repulſe the Solids equally as the Solids do the Fluids.

PROP. IV.

The Quantities of Motion, in all moving Bodies, are, as the Quantities of Matter and Velocities conjunctly.

For if the Velocities are equal, 'tis manifeſt that the Quantities of Motion will be as the Quantities of Matter; and if the Quantities of Matter are equal, the Motions will be as the Velocities: Therefore the Quantities of Motion muſt be in the Compound Ratio of both, or as the Quantities of Velocities multiplied into the Quantities of Matter.

PROP. V.

In all moving Bodies, the Spaces deſcribed by their Motions, are as the Velocities multiplied into the Times of their Deſcription.

For the Velocities being equal, the Spaces deſcribed by their Motions muſt be as the Times; and the Times being equal, the Spaces are as the Velocities: Therefore the Spaces deſcribed will be in the Ratio compounded of the Times and Velocities.

PROP. VI.

If a Body be continually forced or impelled by any given Power, acting upon it inceſſantly and without Intermiſſion, the Motion of that Body, thence ariſing, will be uniformly accelerated; in which the Velocities will be ever as the Times, and the Spaces deſcribed as the Squares of the reſpective Velocities.

A Body being put in Motion, by the Impulſe of a ſuperior Body, will, removing all external Reſiſtances, continue to move on in a tangent Line, with a uniform Velocity in Proportion to, and in the ſame given Direction with, the impreſſed Force, as by Propoſition the ſecond. But when Motion is produced, not by one ſingle Impulſe, but by continued Impulſes of an equal Force without Intermiſſion, the Quantities of Motion will be as the Times; that is, double in a double treble in a treble Time, &c. and the Velocities thence ariſing, will be proportional thereto, by the ſame Propoſition. And conſequently, the Velocities will be equally and uniformly accelerated in Proportion to the Times: But the Spaces deſcribed, are always in a compound Ratio of the Times and Velocities, as by Propoſition the fifth. And therefore, when the Ratio of the Times and Velocities, is the ſame, the compound Ratio of the Times and Velocities will be the ſame with the Squares of the Times, or the Squares of the Velocities reſpectively: Which is the Thing we wanted to prove.

PROP. VII.

All Bodies whatever, even to the moſt minute Atom, have an attractive Force.

ATTRACTION is, by the modern Students in Philoſophy, conſidered two-fold, *viz.*

1. ATTRACTION of Gravitation, whereby one Body attracts another at a Diſtance, and cauſes it to gravitate towards itſelf; therefore ſince Action and Re-action are are always equal and directly contrary to each other, if any Body attracts another, it is alſo as much attracted by the other Body. Therefore from hence we may conclude, that if two Bodies do mutually attract or gravitate towards each other, by Forces proportionable to their Diſtances, they will deſcribe both about the common Center of Gravity, and about each other *concentri-*

cal ellipſes; and, *vice verſâ*, if any Body does deſcribe ſuch Figures, their gravitating or attracting Forces are proportional to their diſtances. And if they attract each other with Forces proportional to the Squares of their Diſtances, they will deſcribe both about the common Centre of Gravity, and alſo about each other, conick Sections having their umbilici in the Centre about which the Figures are deſcribed; and *vice verſâ*. It may be demonſtrated alſo, that any Particle of Matter within the Superficies of any Sphere or Globe is attracted, or gravitates by a Force proportional to its Diſtance from the Centre; but without the Surface of the Sphere, by a Force proportional to the Square of its Diſtance from the Centre.

2. ATTRACTION of Coheſion, which we find only among the very ſmall Parti-

clcs of Matter in Bodies, and of which we ſhall treat of under the next Propoſition.

PROP. VIII.

The Quantity, or Force of Attraction in all Bodies is always proportional to the Quantity of Matter in the attracting Body, as being in Reality nothing but the Reſult or Sum of the united Forces of all thoſe ſingle Particles of which it is compoſed: And from hence we ſhall enumerate its chief Properties.

1. THIS Force is then the greateſt, when the Particles are in Contact, or touch each other.

2. IN homogeneous Particles, the greater the Surface of Contact, the ſtronger the Force.

3. THE Sphere of this Attraction is greater or leſſer, in Proportion to the Quantity

of Matter in the Particle; as is likewiſe its Force.

4. CONSEQUENTLY the denſeſt Particle, whoſe Surface of Contact is largeſt, hath the greateſt Attraction of Coheſion.

5. THIS Force decreaſes nearly as the Cubes of the Diſtances increaſe; and not as the Squares thereof, as in the other Sort of Attraction.

6. IN Particles of the ſame Kind, or equal Denſity, the Attraction is ſtronger between ſmall Particles, than the large; becauſe in thoſe there is a greater Surface than in the theſe; eſpecially if they are of a ſpherical Form.

7. AT equal Diſtances from the Centre of homogeneal Spheres, it will be in Proportion to their Magnitudes.

SCHOLIUM.

SCHOLIUM.

THE attractive Force exerts itſelf only where the Tendency of a Particle another Way is overpowered by its Proximity to that in whoſe Contact it is ſuppoſed to be drawn: For this Property is univerſal, and every Part of Matter, does draw, and is drawn by every other Part of Matter, within one another's Sphere of Attraction; ſo one cannot influence another at any Diſtance, but muſt neceſſarily be very near it; and ſo much the nearer, in Proportion to its Smallneſs: So that upon a double Account, two Particles cannot influence one another by their Attractions, unleſs very near; one from their predominant Inclinations another Way, and the other from the Minuteneſs of their Spheres of Attraction; inſomuch that out of that Reach, they are within their Sphere of Repulſion,

ſion, and conſequently can never come together.

PROP. IX.

If Particles ſwimming in a Fluid attract one another more ſtrongly than they do the Particles of the Fluid, the Force by which they come together, will be as the Exceſs of their mutual Attractions, to their Attractions of the Fluid.

Such Parts of the Fluid as interpoſe between the attracting Particles will be preſſed upon by ſuch their Inclinations to each other; and therefore, according to the Nature of Fluidity, the Parts of the Fluid will be driven out of their Places, by ſuch Exceſs of Preſſure, whereby the attracting Particles will join.

SCHOLIUM.

SCHOLIUM.

If two Globules of Blood get within each other's Sphere of Attraction, they will force the ſerous Parts out of their Places by their Exceſs of Preſſure, and conſequently will be brought into cloſe Contact one with another: which gives Riſe to the Viſcidity and Coheſions of the human Blood, when it has not a proper Degree of Motion from the Solids, to keep its Globules from falling into each other's Sphere of Attraction and Coheſion.

PROP. X.

If Particles ſwimming in a Fluid are more attracted by the Fluid than by one another, they will recede from each other with a Force that will be equal to the Difference of their mutual Attractions, and the Attraction of the Fluid.

For the ambient Particles of the Fluid attracting them more ſtrongly than they do each other, they will by ſuch Exceſs of Force be drawn from one another into Contact and Coheſion with the Particles of the Fluid.

SCHOLIUM.

When the Serum of human Blood attracts its Globules with a greater Force than they attract each other, *i. e.* when the Serum is replete with ſuch Subſtances or Particles of Matter as are angular, [as ſaline Particles,] and conſequently have larger Surfaces than the Globules, which are ſpherical, their Attraction on the Globules will be greater than the Attraction of the Globules upon each other; from whence proceeds a Diſſolution of the globulous Part or Craſſamentum of the Blood; which is followed by a Train of putrid Diſeaſes; by ſome of the Sons of *Æſculapius* called malignant; but for what Reaſon I know not.

PROP. XI.

The Force, by which Particles, attracting one another, cohere, is, Cæteris paribus, in Proportion to their Contacts.

For theſe Parts not in Contact, conduce nothing, or extremely little, to the Force of Coheſion; and a much greater Power is required to ſeparate two Particles which cohere in two Points, than two Particles which cohere only in one Point: For which Reaſon it is, that we find two Pieces of poliſhed Marble adhere more ſtrongly than any other two Bodies of equal Dimenſions, which are not ſo ſolid, but have more Pores and Interſtices between their Parts, and which will not receive ſo good a Poliſh, by which their Parts are brought into ſo cloſe a Contact with one another. And for the very ſame Reaſon it is, that many Bodies which have the leaſt ſpecific Gravity have very often the ſtrongeſt Coheſion and Tenacity; for that whereby Particles of the leaſt Matter in Proportion to their Surfaces are ſpecifically lighteſt, alſo occaſions their ſtrongeſt Coheſions, by being capable of more Contact than Particles of more Solidity under leſs Surface.

COROLLARY I.

THIS Power of Attraction, or Coheſion, in the ſmall Particles of Matter, increaſes, as the Bulk and Weight of the Particles decreaſe. For ſince this Power acts only within the Sphere of Contact, 'tis very evident that the Quantity of this Power or Force muſt be according to the Largeneſs of this Sphere, that is, according to the Largeneſs of the Surfaces of the Particles, and their Denſity. For the Surfaces of all

Bodies in Proportion to their Solidities, are as their Diameters, inverſly: For the Surfaces increaſe or decreaſe as the Squares of the Diameters, but the Solidities as their Cubes. And of Courſe the moſt minute Particles muſt have the largeſt Surfaces, in Proportion to their Solidities, and likewiſe be capable of touching other Particles in more Points, or have greater Spheres of Contact, and certainly have the greateſt attractive Force in Proportion to their Weight. And hereby this Power of Attraction in the ſmall Particles of Matter, being increaſed as their Bulk and Weight are decreaſed, ſuch ſmall Particles will be capable of receiving any given Direction by this Power of Attraction, juſt after the ſame Manner as if they had no ſpecific Gravity at all.

COROLLARY II.

This Power of Attraction or Coheſion in all Bodies will be ever proportional to the Quantity of Contact in the immediately contiguous Particles: and upon this depends the various Degrees of Coheſion in all Bodies.

COROLLARY III.

From this Power of Attraction, or Coheſion, of the moſt minute contiguous Parts of Matter, all the Phænomena of elaſtic Bodies may be explained. For where the minute contiguous Parts of any Body, which unite and ſtrongly cohere by immediate Contact, are, by a Force ſuperior to their Force of Contact, impelled or driven from their Points of Contact to ſome ſmall Diſtance; after this ſuperior Force is taken off, their own attractive Force will again take Place, and the divided Particles return to their prior Contact; by which Means the Body will re-aſſume its priſtine Figure. But when by any ſuch ſuperior Force, the minute contiguous Parts are ſeparated, or forced beyond their Spheres of Attraction, they will not only remain in a State of Disjunction, and be incapable of returning to their former Contact, but will repulſe each other, as they are now in their Sphere of Repulſion: By which the Springineſs or Elaſticity of ſuch a Body will be entirely loſt and deſtroyed.

SCHOLIUM.

FROM hence we may judge of the Phyſical Cauſe of the Relaxation and Contraction of animal Fibres. When the Body is in Health, and a due Equilibrium between the Solids and Fluids, the Preſſure of the Fluids is ſuch as keeps the attractive Particles of the Fibres from adhering too ſtrongly together, growing hard and callous, and the minute Tubes to their proper Diameters. When the Preſſure of the Fluids increaſe, a Force, or Power, will be laid upon the Fibres ſuperior to their Force or Power, of Coheſion; and conſequently the Particles of Matter with which they are compoſed, are forced or driven from their Points of Contact, to Diſtances in Proportion to the greater or leſſer Preſſure of the Fluids, whereby the Fibres are greatly weakned and relaxed. When this Load is not ſo great as to force or drive the Particles of Matter which compoſe the Fibres beyond their Spheres of Attraction, and is very ſoon removed, the Particles will return to their former Contact, and the Fibres to their former Elaſticity and Contraction. But when this Load or Preſſure of the Fluids drive the Particles which compoſe the Fibres, beyond their Spheres of Attraction, or is not timely removed, the Particles will remain in a State of Disjunction, and be incapable of recovering the former Poſition and Contact; and the Spring or elaſtic Force of the Fibres will be weakned, broken, or entirely loſt. Again,----If the Preſſure of the Fluids is weakened, either by decreaſing their Quantity, or Motion, ſo that their Force upon the Solids is not ſo great as is the attractive Force of the Particles which compoſe the ſolid Parts; this attractive Force will continue to increaſe, and the Particles to adhere more ſtrongly together, 'till at laſt the Fibres become hard and callous, (this is generally the Caſe of aged Perſons) the minute Tubes to loſe their natural Diameters, and at laſt theſe Tubes turn into a hard, callous Subſtance.

PROP. XII.

If the attracting Particles are elaſtic, they muſt neceſſarily produce an inteſtine Motion, greater or leſs, according to the Degrees of their Elaſticity and attractive Forces.

Because upon the Occurſions which their attractive Powers draw them into, they will fly off from one another again with the ſame Degree of Velocity that they meet together, allowing for the Reſiſtance of the Medium; but when they approach other Particles in their Reſilition, their Velocity muſt increaſe, becauſe they are afreſh attracted: And therefore meeting a ſecond Time, they will recede with a greater Velocity than they did at their firſt Concurſion; which will continue an inteſtine Motion, as are their attractive Powers and Elaſticities.

PROP. XIII.

All Bodies are capable of being divided ad Infinitum, *or without End; and there is no Part of any one Body, or no Portion of Matter ſo ſmall, but that a Part of another Body may be exactly as ſmall.*

The Diviſibility of Matter is that univerſal Property or Diſpoſition of a Body, whereby it is capable of being divided or reduced into Parts, either actually or mentally, *ad Infinitum*, or without End. This is that Property by which the Particles of Matter in all Bodies are capable of a Reſolution or Diſſolution into their conſtituent Particles, as in many Operations of Chymiſtry. Tho' we have no Poſſibility of an Inſtance of this infinite Diviſibility of

Matter, yet Nature proceeds towards it to inconceivable Lengths, in many of her ſtupendous Operations. The following Inſtances will give us ſome little Inſight into the Diviſibility of Matter. It has been computed, by a very great Mathematician and Philoſopher, that in a Second of Time there flies out of a burning Candle the following Number of Particles of Light, 418,660,000,000,000,000,000,000,
000,000,000,000,000,000,
which is 10,000,000,000, or Ten Millions of Millions a bigger Number than 100,000,000,000,000,000,000,000,000,000,000, the Number of the Grains of Sand, computed to be in the whole Earth; and if ſo many Particles of Light flies out of a Candle in a Second of Time, what an infinite Number muſt fly off from that Candle during the whole Time of its Burning: If the Orbit of Saturn, which is calculated

to be 777,000,000 of Miles Semi-diameter, was full of Grains of Sand, it would not be equal to the number of minute Particles that a burning Candle may be divided into.

AGAIN, our ingenious Countryman, Dr. KEILL hath computed the Magnitude of a Particle of Aſſœfætida, to be $\frac{38}{1000000000000000000}$ Parts of a Cubic Inch. He has likewiſe proved that one of thoſe Globules of Blood, which circulate in the Arteries of ſome minute Animals, doth not exceed the $\frac{8}{100000000000000000000000000000000}$ Part of a Cubic Inch. And farther, he hath alſo plainly demonſtrated that one Grain of Sand will contain

125,000,000,000,000,000,000,000,000 of the aforeſaid Globules of Blood; which is 10,256 Times more than the higheſt Mountain upon Earth contains Grains of

Sand. And yet farther with reſpect to the Diviſibility of Matter, he hath ſhewn the leaſt Particle of Matter may be made to fill the Orbit of Saturn, ſo that there ſhall be no Pore therein, whoſe Diameter ſhall exceed the 1,000,000,000,000th Part of an Inch. But as we have likewiſe taken Notice that there is no Part of any Body, or no Portion of Matter ſo ſmall, but that a Part of another Body may be exactly as ſmall; ſo on the other hand, there is no Part of Matter ſo ſubtile, but any other, the moſt groſs, may be divided into Parts no bigger than the Parts of that ſubtile Matter.

PROP. XIV.

Thoſe ſecondary Qualities of Bodies called Fire, and Air, act and re-act mutually upon each other: That is, the Air is expanded and rarefied by Heat, which is the Action of Fire; and Fire is excited and put into its moſt violent and rapid Motion, by the Expanſion of the Air.

IT has been found, by very numerous and accurate Experiments, that the Atmoſphere, or Column of Air which ſurrounds the Earth, is a compreſſible and expanſive Fluid; whoſe Denſity is in Proportion to its Compreſſion: And therefore ſince the Air is compreſſed by the Weight of the incumbent Atmoſphere, and the Denſity of Air is proportionable to the Force compreſſing it, it follows by Computation, that at the Height of about 7 Miles from the Earth, the Air is 4 Times more rare than at the Surface. And at the Height of 14 Miles it is 16 Times more rare than at the Surface; and at the Height of 21, 28, or 35 Miles, it is reſpectively 64, 256, or 1024 Times more rare; and ſo on in a geometrical Proportion of Rarity, compared with the arithmetical Proportion of its Height. *See Newton's Optics.*

THAT Air may be rarefied may be very plainly proved, as thus, If you take a Bladder, which appears to you to be entirely empty, and tie its Neck with a ſtrong Thread, and lay it in a warm Place, or before the Fire, the Heat will ſo rarefy the little incloſed Air, as to make it extend the Bladder to its utmoſt Stretch, and, if continued, will break through it with the Report of a Gun: Alſo it may be proved by various Experiments, that Air may be ſo condenſed by Art as to take up but $\frac{1}{60}$ Part of the Space it poſſeſſed before.

Some of our modern Philoſophers have found that Air, by the bare Force of its Spring, will dilate itſelf into 13,000 Times the Space it poſſeſſes under the Preſſure of the Atmoſphere. And as it may be compreſſed into 60 Times a leſs Space than that, it is plain, that the Air poſſeſſes a Space 780,000 Times greater at one Time than another; for 13,000 multiplied by 60 is equal to 780,000. It may plainly be proved, by Experiments of the Barometer, that the Preſſure of the Air is capable of raiſing a Column of Mercury to the Height of 28, 29, 30, or 31 Inches; therefore ſuch a Column of Mercury is equal in Weight to a Column of Air (of an equal Baſis) which proceeds from the Mercury in the Tube to the uppermoſt Part of the Atmoſphere: and as Mercury is about 15 Times heavier than Water, therefore Water will riſe in a Tube to 32 or 33 Feet in Height; and therefore every ſquare Foot on the Earth's Surface ſuſtains the Weight of a Column of Water of 32 or 33 ſolid Feet. Now a Cubic Foot of Water weighs about 63 Pounds; hence the Weight of Air on every ſquare Foot is above 2000 Pound Weight. So if we allow a middle-ſized Man to be about 12 ſquare Feet, then the Weight of Air preſſing upon the Body of ſuch a Man is equal to 24,000 Pound Weight; and had it not been for the internal Air, or the Air within all Bodies; which though it be ſmall, yet it can balance, reſiſt, and equiponderate the Force of the external Air; Men, Beaſts, Houſes, &c. would be cruſhed to Pieces with ſuch an intolerable Weight of Air.

COROLLARY.

Air loſes its Elaſticity and expanſive Force, in Proportion as it is deprived of the Light or Particles of Fire which it imbibes and retains. For as the Elaſticity of the Air is increaſed in Proportion to the Quantity of theſe Particles it contains, and the Motion it is put into; ſo the total Abſence of theſe Particles, and the Privation of its Action or Motion, would undoubtedly deſtroy that Property of the Air, and leave it without any Elaſticity or expanſive Force at all. 'Tis evident likewiſe on the contrary, that Light or Fire loſes all its Motion or Action, and is preſently reduced to a State of Reſt, as ſoon as it is deprived of Air. For ſuch is the extreme Fineneſs and Tenuity of this Fluid, that it might very eaſily, even in its moſt rapid Motion, penetrate the Pores of all Bodies, without making any Change or Alteration upon them, were it not for the Air which they contain; which being a groſſer Element, and being put into Action by Fire, is capable by its great expanſive Force, to diſſolve and ſeparate the moſt ſtrongly cohering Parts of mixed Bodies. Various other Experiments and Obſervations might be made to evince this mutual Action and Re-action of Fire and Air upon each other, and to ſhew the Neceſſity of both of them conjunctly, in order to the proper Efficacy and Effect of either: But this Matter is ſo well known that it would be needleſs to ſay any more upon it.

PROP. XV.

This expanſive Force of heated Air, or the mutual conjunct Action of Fire and Air, is the univerſal Principle or natural Cauſe of Fermentation, Diſſolution, and Fluidity.

Upon the different Proportion and Adjuſtment of the attractive coheſive Force, we have treated of in the preceding Propoſitions, and this centrifugal expanſive Force, with Reſpect to each other, the different internal Conſtitution, Texture, and Coheſion of Bodies will plainly depend; and from thence muſt be judged of and eſtimated. By the attractive coheſive Power alone the Particles of all compound Bodies muſt be brought to their greateſt Degree of Contact, where they would remain at abſolute Reſt, and be fixed into ſtrongly cohering Maſſes of Matter; whoſe Denſities, Solidities, and Degrees of Coheſion, will be always in

Proportion to the Degrees of Contact in the immediately contiguous and cohering Particles: And therefore by the ſole Action of this attractive coheſive Force, all Bodies will become hard, and ſtrongly cohering, Maſſes of Matter, all Fluidity muſt be abſolutely deſtroyed; all Fermentation or the inteſtine Motion, of the Parts of compound Bodies muſt ceaſe, and all theſe hard Maſſes remain fixed and unchangeable in a State of internal Reſt and Solidity, without any Fermentation, Solution, or Diſſipation of their Parts.

BUT when this attractive coheſive Power of all Bodies is laid aſide, and the centrifugal Force or Power of Fire and Air, acts alone, the Conſequences are quite different; for now all Bodies, even the moſt hard and ſtrongly cohering, muſt be diſſolved, diſſipated, and diffuſed, ſo as to conſtitute a general fluid Maſs of Matter, without any Diſtinction, or different Coheſion of Parts; but would ſtill be retained within the Sphere of Attraction of their common Centre.

Having now pointed out the different Effects of theſe two Powers or Forces upon all Bodies, while they act ſeparately, we will now proceed to ſhew the different Effects they have upon all Bodies when they act together, upon their different Conſtitutions and Coheſions, their various Degrees of Solidity and Fluidity, with the ſeveral Changes and Viciſſitudes they undergo, with the Corruption and Diſſolution that ſome Bodies ſuffer in order to make Way for the Generation and Concretion of others. All theſe muſt be owing to the different Proportions of thoſe Forces or Powers, acting in Conjunction under certain Conditions or Laws.

WHERE theſe two Forces or Powers, in the Conſtitution of any Body or Maſs of Matter are equal, that Body or Maſs of Matter muſt continue in, or preſerve its preſent State of Fluidity, Solidity or Degree of attractive Coheſion: As in this Caſe its Particles of Matter muſt have the ſame Quantity of Contact, they can neither approach nearer to, nor recede farther from each other; that is, the Body with Regard to its internal Conſtitution, Texture, or Coheſion of Parts, can admit of no Change. When the attractive Force is ſuperior to the centrifugal or expanſive Force, the Particles of Matter of the Body will be brought nearer to each other, 'till the Quantity of their Contact is as great as the Particles will admit of; and there they will remain in a Degree of Solidity or Force of Coheſion proportionable to their Quantity of Contact. But when the centrifugal or expanſive Force of the Air and Particles of Fire included in any Body or Maſs of Matter, is ſuperior to the attractive Force of the contiguous Particles; the Particles, which conſtitute any ſuch Body or Maſs of Matter, muſt recede from their Points of Contact: And this happening between every Particle of Matter of which the Body or Maſs is compoſed, every ſmall Particle muſt be divided from its contiguous Particle, and the whole Body muſt be divided and ſeparated into minute Particles, and theſe again into others which are more fine, and ſo on, 'till they cannot be divided farther.

This Receding of the Particles of Matter, which compoſe all Bodies, from their Points of Contact, is what we may call Rarefaction. And when thoſe Particles approach nearer to their Points of Contact, *i. e.* when the attractive Force is ſuperior to the centrifugal Force, we may call it Condenſation. Now, from the Efforts of theſe Forces being directly contrary, the conſtituent Particles of Bodies, which have a continual Tendency towards their Points of Contact, are forced off by the centrifugal Force of the Air and Particles of Fire, and there muſt neceſſarily enſue an inteſtine Motion, Colliſion, and mutual Struggle among the Particles themſelves, *i. e.* the Particles acted upon by two Forces which are quite oppoſite to each other will recede and accede, in Proportion to the Strength of theſe oppoſite Powers, 'till one or the other gains the Predominancy, either to condenſe and fix the Body, or rarefy or diſſolve it: And from hence we may judge of the Fermentation or inteſtine Motion of all Bodies.

When the attractive Force or Power in Bodies, is ſuperior to the contrary Power to any conſiderable Degree, Bodies which are the moſt fluid and fluxile will immediately be fixed and condenſed; as may be proved by Water and other Fluids being turned into Ice, when the Particles of Fire and Air, contained within the Pores and Interſtices of ſuch fluid Bodies, are reduced to a State of Reſt; upon which the attractive Force or Power of the conſtituent Particles, becomes ſuperior to the other Power, and the Fluid is immediately fixed and condenſed, 'till the expanſive Force of the Air and Particles of Fire are again put in Motion; which ſoon reduce the Body to its former State of Fluidity. It may likewiſe be very plainly proved, that by the centrifugal or expanſive Force of Fire and Air, the moſt denſe Bodies may be diſſolved and their Particles of Matter ſeparated, each Particle from its contiguous Particle: to prove which we will give the following Inſtance.

TAKE any Quantity of the Filing of Iron and Steel, and mix it with ſtrong Spirit or Oil of Vitriol, and immediately there will enſue a ſtrong Fermentation, Effervеſcence, and Ebullition of the Spirit, with great Heat and Fumes; during which the denſe compact Body of the Iron or Steel is entirely diſſolved, its Particles divided, and diffuſed through the diſſolving Menſtruum; which, from what we have already laid down, may be eaſily accounted for. The Spirit, immediately after Mixture, ruſhes into the Interſtices and Pores of the Iron, and is ſtrongly attracted by the Parts of the Mineral: By which the Air, which before filled up the Pores and Interſtices of the Mineral, having now very little Room to expand, will be forcibly compreſſed. In Conſequence of which Compreſſion, the included Air aſſumes its elaſtic Force, by a ſtrong Propenſity that Fluid has to expand and fill its former Space; which being counteracted upon by the attracted compreſſing Menſtruum, there muſt enſue a Fermentation or inteſtine Motion of the Particles of Matter which compoſe the Iron. By which the Fire contained in it and diffuſed through its Subſtance, will be excited and put into Motion, which heats and expands the Air, and increaſes its elaſtic Force: And the Action of the Air being increaſed, communicates a more violent and rapid Motion to the included Fire, ſo that by the mutual Action of theſe two Elements upon each other, the centrifugal Force of the Particles of Iron, becomes ſuperior to their attractive Force; and conſequently the

Particles of the Mineral muſt neceſſarily recede more and more from their Points of Contact, and be ſeparated and divided into the moſt minute Particles, which will be equally diffuſed through the whole Menſtruum; and the Air, now ſet at Liberty, will be ſeen to aſcend through the Menſtruum in ſmall Bubbles. We ſhould likewiſe obſerve, that the Gravity of the minute divided Particles of the diſſolved Body being leſs than the attractive Force of the diſſolving Menſtruum, this attractive Force of the Menſtruum or Fluid ſuſpends ſuch minute Particles, and retains them in any given Poſition againſt their Force of Gravity. And from hence we may account for the natural Cauſe of Fluidity, inteſtine Motion, Diſſolution, and Putrefaction in all Bodies.

SCHOLIUM.

By this wonderful and moſt extenſive Power of corpuſcular Attraction and Repulſion, we may account for moſt or all the Phænomena of Nature ariſing from the heterogeneous Mixture and various Aſſociations of Particles of different Bodies; and why, in ſome Caſes, thoſe Particles ſhould readily attract, and in other Caſes ſo ſtrangely repel each other. We will here give a few Inſtances of ſome curious Phænomena of Nature, which may very eaſily be explained and accounted for from thoſe Principles, and to explain which, many Philoſophers have had Recourſe to baſeleſs Hypotheſes, and a great many dark abſtruſe Terms, and other empty Notions. The Phænomena, I mean, are the Aſcent of Vapours, ſmall Particles of Water, and other heavier Bodies, in the Atmoſphere; the Aſcent of the Juices from the Roots to the moſt minute Parts of Trees and Vegetables, of all Kinds; the Circulation of the Blood thro' the moſt minute Arteries; and the Paſſage of the Lymphatic Parts of that Fluid through the moſt minute Glands and vaſcular Fibrillæ.

A GREAT many of our modern Students of Nature have endeavoured to account for the Aſcent of Water and other heavy Bodies in the Atmoſphere, from the Principles of Hydroſtatics only. But as their Aſſertions will appear falſe to any Perſon who has the leaſt Knowledge of natural Bodies, we ſhall not ſpend any Time to confute them, but proceed to ſhew the true Cauſe of the Phænomena we have propoſed.

A Body being immerſed in a Fluid, whoſe ſpecific Gravity is the ſame with that of the Body, will every where reſt in it, without aſcending or deſcending; but if the ſpecific Gravity of the immerſed Body is leſs than is that of the Fluid, the Body will ſwim on the Surface of the Fluid. When the immerſed Body has greater ſpecific Gravity than the Fluid in which it is immerſed, it muſt of Courſe ſink to the Bottom by its own Weight, and remain there, except it be raiſed and ſuſpended by a ſuperior Force. This may likewiſe be applied to various Fluids, whoſe ſpecific Gravity conſiderably differs, and which will not mix when thrown together in the ſame Veſſel, but will take Place according to their ſpecific Gravity; that which has the greateſt ſpecific Gravity will deſcend to the Bottom, and that which has the leaſt will aſcend to the Surface. Now the centrifugal Force of Air and the Particles of Fire, as we have proved before, forces the Particles of Matter which compoſe all Bodies farther from their Points of Contact, and thereby divides them, each Particle from its contiguous Particle; but each minute divided Particle will retain the ſame ſpecific Gravity as any Portion of the Maſs from whence it was taken. Water therefore when ſeparated into the moſt minute Particles by Rarefaction, will ſtill have the ſpecific Gravity with the Fluid from which it was forced, which is computed to be 14 Times heavier than an equal Bulk or Portion of Air, and therefore cannot poſſibly aſcend and be retained in it, by any Law of Weight or Preſſure. And we are well aſſured that all denſe Bodies, even Quickſilver itſelf, with the Aſſiſtance of

Heat, will be forced into Vapour, and fly off in the Atmoſphere.

But from our foregoing Propoſitions, theſe Phænomena may be very eaſily explained and accounted for. This attractive Force, with which the minute contiguous Particles of Matter attract and unite, increaſes as their Weight decreaſes, or as their Surfaces increaſe in Proportion to their Solidities; from whence 'tis very plain that their attractive Force increaſes as their Weight decreaſes, 'till the latter becomes of no Conſideration with Reſpect to the former. In this Caſe, the minute Particles of Water, or any other Body, being ſeparated by the centrifugal or expanſive Force of the Air and Particles of Fire which is within them, will be attracted, and that ſtrongly, by the contiguous Parts of the Atmoſphere, which attract the many Way or every Way, horizontally as well as perpendicularly, as if they had no ſpecific Gravity at all.

FROM this ſame Law of Nature, the Motion of the Juice of Trees and Vegetables, from their Roots, through the very minute Veſſels of which the Bodies of Trees and Vegetables are compoſed, may be accounted for. The Juices of moſt, or all, Kinds of Vegetables, when left to Nature's Huſbandry, are known to deſcend in Autumn to the Roots, and there remain in a State of Inactivity or Condenſation during the Winter; that is, their aerial and fiery Particles are fixed and condenſed by the Cold of the Atmoſphere, and conſequently their attractive coheſive Force is increaſed, and their Juices altered, from a State of Fluidity to a jelly-like Subſtance: But when the vernal Sun ſheds his Rays upon the Earth, its Particles expand the Particles of Air which is contained in the Pores and Interſtices of the Juices, and conſequently, as we have explained before, ſet their elementary Fire in Motion; whence ariſes,

Firſt, AN inteſtine Motion of the Juices;

And Secondly, A RAREFACTION for their Subſtance.

AND ſince every Fluid, as the Juices are now brought to a State of Fluidity again, will riſe in a ſmall open Tube of a given Diameter to a given Height by the Force of Attraction, without any Preſſure from the Fluid; and ſince this Height is always in the reciprocal Ratio of the Diameter; 'tis very evident that a Fluid, by this Means only, may aſcend in ſmall Tubes to any given Height, if the Diameter of the Tube be proportionally leſſened; but when to this is added the centrifugal Force of the elementary Fire and Air contained in the Juices, which divides their Particles, each Particle from its contiguous Particle, and with a ſtrong Impulſe forces this rarified Subſtance up theſe Tubes, it is no Wonder that they ſhould not only be forced into the moſt minute Branches, but likewiſe, where the Reſiſtance is the leaſt, diſtend their Veſſels ſo, as to form new Branches.

Likewise from the ſame Principle and Law of Motion, joined to the Preſſure of the Muſcles, it may be plainly proved, that the Blood in animal Bodies circulates through the moſt capillary Arteries, and extremely minute glandular Strainers; and likewiſe the lymphatic Juice through its capillary Tubes. Muſcular Action has certainly the greateſt Share in propelling the animal Fluids through all the Veſſels of the Body, and likewiſe contributes to empty the capillary Veſſels of their contained Fluids; but that by this Force alone, the minute capillary Veſſels of the Body, ſhould be filled with their proper Fluids, is as much impoſſible as it would be to force a viſcid Juice from the Root through the denſe Trunk of a large Tree; which is very certain cannot be done by any Force of Impulſe or Preſſure whatever.

CHAP. II.

Of ANIMAL SECRETION.

PROP. I.

The Blood of all Animals, from whence all the Secretions of the Body owe their Source is a Fluid conſiſting of globular and ſerous Particles; its globular Particles are ſpecifically heavier than its ſerous Particles, and are endued with a ſtronger corpuſcular Attraction, elaſtic Force, and which receive and retain a greater Degree of Heat.

THE Blood of all Animals, when drawn out of the Body, does naturally divide itſelf into two different Parts, called globular and ſerous Parts, of which the red or globular Part does in a very little Time coagulate, but the ſerous Part remains fluid. Theſe two different Subſtances, though of unequal ſpecific Gravities, while they continue to circulate in the Veins and Arteries, and have a proper Degree of Motion and Preſſure from the Muſcles, and the continued Action of the expanſive Elements we have juſt now deſcribed, are equally mixed and blended together. The Blood viewed with a Microſcope while it circulates in its containing Veſſels, appears to conſiſt of numberleſs minute red Globules, or Spherulæ, which ſwim in and are equally diffuſed through a thin pellucid Lymph, or Serum. When we examine a Drop of Blood, as it is drawing from the Veſſel, with the aforeſaid Inſtrument, we ſhall for a Moment diſcern a great Number of red Globules (as in the laſt Obſervation) ſwimming in a lympid Fluid; and perceive how the Globules attract one another, and unite like Spheres of Quickſilver, which as they touch, run into one another; and conſequently the Blood divides into two Parts.---After the globulous Part of the Blood is ſtrongly connected together, by the great attractive Force of its Globules, if we carefully examine the ſerous Part, with a good Microſcope, we ſhall diſcover in it likewiſe a great Number of Particles of various Figures and Magnitudes, which float in a lympid Fluid. Theſe Particles, which appear to be moſt ſaline, do not attract and unite with one another ſo ſtrongly as the former did, 'till Part of their Vehicle has been evaporated by Heat, and then they may be obſerved to attract each other as ſtrongly as the Globules did, TAKE any Quantity of this compound Maſs, as it is letting out of its containing Veſſels, and received in a Porringer, and ſet it by to reſt, that the Particles of which it is compoſed may take Place according to their ſpecific Gravities; the Globules will be found to unite immediately, by their corpuſcular Attraction, and when firmly united, will ſink to the Bottom, and there form its globular or coagulated Part, while the Serum will aſcend and envelop it. From whence we may plainly conclude that the Corpuſcles or Globules, which form the globular Part, muſt have greater ſpecific Gravities than the Particles of the ſerous Part,

THIS therefore is certainly Fact without any Contradiction, that the Blood conſiſts of a ſimple and lympid Fluid, in which is contained Corpuſcles of various Figures and Magnitudes, which are endued with different Degrees of an attractive Force. Now of ſuch Particles as the Blood is compoſed muſt the Juices be compoſed, which are ſecreted from it; therefore as the Particles which compoſe the Blood are endued with an attractive Force, ſo likewiſe muſt the Particles of the Juices which are ſecreted from it.

FROM what we have already proved, we may reaſonably conclude that the Particles which compoſe the globular Part of the Blood have a greater ſpecific Gravity than the Particles which compoſe the ſerous Part; and of Courſe muſt be more denſe and ſtrongly connected, and muſt be endued with a ſtronger attractive Force; And as the globulous Part or Craſſamentum conſiſts of Particles which have the greater greateſt ſpecific Gravity and are the moſt denſe, ſo it certainly muſt be capable of receiving, and retaining, a greater Degree of Heat than the ſerous Part, which is of a more looſe and open Texture.

The learned Dr. *Jurin* has very much obliged the World in proportioning the ſpecific Gravities of the globulous and ſerous Parts of the Blood, and common Water. By comparing and adjuſting his ſeveral Experiments, and taking a mean Proportion, he finds that the ſpecific Gravities of the globulous and ſerous Parts of the Blood, and common Water, are as 1054, 1030, and 1000 reſpectively. From whence we may plainly ſee that the globulous Part of the Blood has greater ſpecific Gravity than the ſerous Part; as when this is ſeparated it leaves the ſerous

Part ſpecifically lighter than the compound Maſs.

THE Globules of the Blood in their natural and healthy State, (which is the State we treat of here, as a vitiated State of the Blood alters the Caſe much) are certainly of a looſe ſpungy Texture, and contain in their Pores and Interſtices a conſiderable Quantity of its ſerous Parts; which being ſeparated by Diſtillation, is found to be ſtrongly impregnated with Volatile Salt and Oil, and its ſpecific Gravity is to that of common Water, as 1080 is to 1000. But the ſpecific Gravity of the remaining Craſſamentum is as 1280: Therefore if we compare this Experiment with that made by Dr. *Jurin*, and take the mean Proportion, the ſpecific Gravity of the Blood-Globules in their natural State will be as 1126.

PROP. II.

To calculate the abſolute and relative Velocity of the Blood.

THE abſolute Velocity of the Blood, or the Velocity of that Fluid in the Aorta, may be thus determined. The Velocity with which a Fluid flows out of any Orifice uniformly and in the ſame Quantity, is equal to the Velocity of a Body which deſcribes a Space of the ſame Length with that of a Cylinder, whoſe Baſe is equal to the Orifice, and whoſe Magnitude is equal to the Quantity of the Fluid that runs out in the ſame Time, as may be proved by ten Thouſand Experiments. Now we will take a middle ſized Man, in Health, whoſe Heart contracts near about 68 Times every Minute, and at each Contraction or Syſtole, throws into the

Aorta one Ounce of Blood. One Ounce of Blood is equal in Bulk to 1.65 Inch, and conſequently 68 Ounces are 112.20 Inches.

The Diameter of the Aorta in a middle ſized Man is about 0.7 of an Inch, and there its Orifice is 0.4, by which divide 112.2, the Quotient 280 Inches gives the Length of the Cylinder, or the Space thro' which the Blood will go in a Minute, ſuppoſing it were conſtantly flowing out of the Heart with the ſame Velocity: But becauſe of the Diaſtole of the Heart, which we may compute to be about half the Time of a Pulſation, and conſequently muſt throw out an equal Quantity with the Syſtole, ſo that the Blood will deſcribe 560 Inches in a Minute; we may allow for the abſolute Velocity of the Blood in that Man.

For the relative Velocity. If the Sum of the Sections of the Branches of the Arteries were always equal to the Section of their Trunks, and if the Circuits in which the Blood moves were every where equal, the Velocity of this Fluid would be every where the ſame as it hath been determined to be in the Aorta. But ſince it appears by Experiments, that the Sum of the Sections of the Arteries are greater than the Section of their Trunks before the Diviſion; therefore the Velocity of the Blood muſt decreaſe as the Number of the Branches increaſe. And therefore the Ratio in which the Sections increaſe being given, the Ratio in which the Velocities are decreaſed will be likewiſe given. Now when we have any given Number of the Sections of the Branches of the great Artery; and the Sum of the Sections of the Branches to be every where in Proportion to their Trunks: Let the Velocity in the Aorta or great Artery be called A, and the Notion of the Trunk to the Sum of the Sections of any two Branches called call E: Then A will be equal to the Velocity of the Blood of the Aorta; A E the Velocity after the firſt Diviſion; A E 2, the Velocity at the ſecond Diviſion; A E 3, the Velocity at the third Diviſion, and ſo on; ſo that A E 30, will be the Velocity at the 30th Diviſion.

Our ingenious Countryman Dr. *Keil*, after many Obſervations and Experiments, found that the moſt uſual Proportion between the Sections of the common Trunk, and the Sum of the Sections of its Branches, is that of $\frac{10000}{12387}$: Upon which Suppoſition let it be required to find the relative Velocity of the Blood at any Diviſion; for Inſtance the 30th the Logarithm of $\frac{10000}{12387}$ is 9.9070296; which multiplied by 30, the Index of the Power E, gives 7.2108880 to which the Number anſwering in the Tables is 0.00162512; that is the Velocity in the Aorta, is to the Velocity at the 30th Diviſion as 1 to 0.00162512, or as 615 to 1. And therefore if the Blood in the Aorta move 560 Inches in a Minute, at the 30th Diviſion it will not move one Inch in the ſame Time; and conſequently its Velocity will decreaſe in the ſame Proportion to the 50th or 60th Diviſion.

SCHOLIUM.

From all this it appears, that, when the whole Maſs of Blood and Juices are to be altered, a Courſe of Medicine ſhould be continued for a long Space of Time, becauſe the Blood moves ſlower and ſlower the farther it moves from the great Artery, and conſequently it muſt be ſome Time before the whole Maſs can be affected with the alterative Medicine. And becauſe the Motion of the Blood through Glands which receive Arteries immediately from a great Artery, is very quick, they may carry off a great Proportion of the Medicine in a very ſhort Time; and conſequently it is not the taking of a great Quantity of any Medicine that can alter the Maſs of Fluids, but a conſtant taking of it. And from hence we may ſee the Reaſon when the Blood is to be altered by any Medicine, which is apt to paſs off through the Glands of the Kidneys, that this Medicine ſhould not be uſed in large Quantities: For if it paſs off by this Outlet, it has not the deſired Effect; and if it is taken in a little Time, it mixes but with a ſmall Quantity of the Blood, which muſt greatly diſorder the Animal Oeconomy.

PROP. III.

Muſcular Motion is performed by the Vibrations of a very fine elaſtic Fluid, which moves through the Nerves, and contracts and reſtores the nervous Fibrillæ againſt the Force of the circulating Blood, excited by the Power of the Will, Heat, Wounds, the ſubtile and active Particles of Bodies, and other Cauſes.

BEFORE we enter upon the Proof of this Propoſition, it will be very neceſſary to give ſome Account of the Nature of a Muſcle.

A MUSCLE is a Bundle of minute Blood-Veſſels, conſiſting of Arteries and Veins, laid one upon another in very thin parallel Plates, running through the whole Length of the Muſcle. Theſe minute Blood-Veſſels are every where, at ſmall Intervals, contorted and bound about with ſmall, tranſverſe, and ſpiral Ramifications and Twinings of the Nerves, which our modern Anatomiſts call the white, ſpiral, and tranſverſe Fibres. The Muſcle thus formed has two Ends, which are called the Tendons, faſtened to two Bones, the one moveable, the other fixed; and therefore when the Muſcles contract, they draw the moveable Bone according to the Direction of their Fibres.

But before we proceed farther, we ſhould obſerve that there are two Kinds of Muſcles, the one of voluntary Motion, and the other of mere natural or neceſſary Motion.

The Muſcles of voluntary Motion have their Antagoniſts, which act alternately in a contrary Direction, the one being ſtretched and extended, while the other is contracted ; and theſe, like all the Phænomena of Nature, are moſt wonderfully contrived, and plainly point out to us the great Wiſdom of their Contriver ; for if the Muſcles appropriated to voluntary Motion had not Antagoniſts or counteracting Forces, the expanſive Force of the circulating Blood would not be ſufficient to prevent a ſpaſmodic Contraction of the Muſcles, whereby the Body would be deprived of that gentle eaſy Motion it now enjoys.

But the involuntary Muſcles are compoſed of Fibres which are not ſo elaſtic as are thoſe of the voluntary Motion, and conſequently their Power of Contraction is not ſo ſtrong, nor have they any Need of Antagoniſts.

Now we will proceed to point out what is in common to both theſe, as eſſential to all muſcular Motion whatever. In order to which, we ſhall in the firſt Place obſerve, that all the Fibres which compoſe the nervous Coats that enter into the Structure and Conſtitution of the Muſcles, are endued with a Springineſs, and Elaſticity, or Power of contracting or reſtoring themſelves, againſt a given Weight or Force; and that this Elaſticity, or contractive reſtitutive Power is acted upon by an elaſtic Fluid, which moves thro' the Nerves, and by the Command of the Will, and other Cauſes, is excited ſo as to cauſe a Contraction in any Muſcle of the Body.

A great many Objections have been made to theſe Aſſertions, by ſome of our modern Phyſicians, Anatomiſts, and others after their Example; but in order to prove the Truth of our Aſſertions and the Fallacioufneſs of theirs, we will fairly ſtate what they aſſert to be the Cauſe of muſcular Motion, and prove it to be without Foundation; afterward we will endeavour to prove, that what we have aſſerted to be, is in fact, the true Cauſe of muſcular Motion.

The firſt Objection they make to this nervous Fluid is, that the Nerves are not pervious, but a Bundle of denſe Fibres ſtrongly connected together.

Secondly, That the Brain, which contains an infinite Number of the moſt minute Glands, and which will ſeparate a Fluid, as fine almoſt as Æther, and from which all the Nerves take their Origin, is an uſeleſs Organ; for they that aſſert the Contractions,

tractions of the Muſcles are performed by a natural inherent Property of the Fibres themſelves, and do not depend upon any Fluid whatever; and that this contracting and reſtoring of the Muſcles, performed by their inherent contractive reſtitutive Power, againſt the expanſive Force of the circulating Blood, is the Cauſe of muſcular Motion.

THIRDLY, They aſſert, that if there is ſuch a Fluid in the Nerves as we have aſſerted, it is of the Conſiſtence of the White of an Egg, and is altogether unfit for muſcular Motion.

AND Fourthly, No leſs a Man than the great NEWTON has aſſerted, that the Capillamenta of the Nerves are each of them ſolid and uniform, and that this Motion is performed by the vibrating Motion of an

Æther, which may be propagated along them from one End to the other uniformly, and without Interruption: But how this Æther, which this great Man proves to be 700000 Times more rare than our Air, and conſequently, according to his Laws of Matter, muſt have a very great attractive Force, ſhould move ſo freely through attractive Matter and not be united to it, he has not determined; he has only aſſerted that its Vibrations or Pulſes move ſwifter than Light, and conſequently above 700000 Times ſwifter than Sound.

And Laſtly, He has aſſerted that its vibrating Motion is regularly propagated through Bodies made of uniform Matter, but is reflected, refracted, interrupted or diſordered, by any Unevenneſs in the Bodies.

These are ſome of the principal Objections they make to what we have aſſerted, and each of them pretends to prove his own Notions by a Multitude of Experiments.

We will now endeavour to prove their Aſſertions to be without Foundation, and only hypothetical, and their Objections falſe. As thus: The firſt Objection they make to our Aſſertions is, that the Nerves are not pervious; and this muſt appear evidently falſe to any Perſon who never ſaw a Nerve; and that for two Reaſons:

First, Whatever is not pervious cannot be nouriſhed, and conſequently, by being in continual Action, muſt wear out ſoon.

AND Secondly, If all Parts of the human Body, or indeed of any other Body, were not pervious, their attractive Force, which then would be the only Force that could act upon them, would ſoon render them much harder than the moſt denſe Body upon Earth. But ſtrictly ſpeaking, there is no Part of Matter whatever but what is pervious, and conſequently is capable of receiving a Fluid. To prove their Aſſertions in this Point, they inſiſt that the Nerves do not appear to be Tubes even when viewed with a good Microſcope. But what will be anſwered when we aſſert in our turn that they cannot ſee, even when aſſiſted with their beſt Inſtruments, the Pores of a Body that will emit Quickſilver through them; the inſenſible Perſpiration which paſſes off from the human Body, which compared to this elaſtic Fluid of the minute nervous Tubes muſt be a groſs Body; they cannot ſee the Air, which is a denſe Body that preſſes them with ſome Tons Weight continually. And yet becauſe they cannot ſee the nervous Tubes, they will make them to be ſolid and impervious; though according to their own Account, notwithſtanding their great Denſity, and conſequently attractive Force, they muſt let Æther circulate freely through them, to cauſe this Contraction and Elaſticity neceſſary for muſcular Motion.

Their ſecond Argument to prove, that the Brain does not ſeparate a Fluid from the Blood, to move through the Nerves, and occaſion their Contractions and Vibrations, is, that they cannot diſcover the Nerves to be pervious, even with their beſt Glaſſes. But this Notion is built upon ſuch a weak Foundation, that it will fall with its own Weight, without the Aſſaults that it may receive from Reaſon and Experience. For, in the firſt Place, the whole cortical Subſtance of the Brain, may be ſeen to be nothing elſe but a Heap of little oval Glands, which receive the capillary Branches of the Veins and Arteries that belong to the Brain, and theſe terminate in the medullary Subſtance; which going out of the Cranium, form the Nerves, and Medulla Spinalis contained in the Vertebræ. This medullary Subſtance may, by a ſolar Microſcope, be plainly ſeen to be nothing but a Heap of Glands, which are yet ſmaller than thoſe of the cortical Subſtance, and the Fibres which take their Riſe from this Subſtance, which is the Beginning of the Nerves, are the excretory Ducts of theſe Glands: This does not only appear from the Structure of this Organ, but from Reaſon and Experience. In the Year 1755 we cut out the fifth Pair of Nerves from an Ox juſt killed, divided them, and obſerved them with a good Solar Microſcope, and not only our Pupils, but ſeveral others, plainly ſaw them to be pervious: and notwithſtanding what has been aſſerted to the contrary by ſeveral of our modern Philoſophers, we will not ſcruple to pronounce them ſo. But yet all theſe Glands and Tubes, which compoſe the Subſtance of the Brain and Nerves, muſt be of no Uſe, according to the Notions of our modern Writers.

THEIR third Objection is, That, if ſuch a Fluid is ſecreted by the Brain, and moves through the Nerves, it cannot be fit for muſcular Motion, being not much unlike the White of an Egg; and ſerves only to moiſten and lubricate the nervous

Fibres. Now certainly a Surgeon's Apprentice that ever ſaw a Nerve, would laugh to hear ſuch Aſſertions. We always underſtood that an elaſtic Fibre would be greatly relaxed, or its Elaſticity almoſt deſtroyed, by being immerſed in ſuch a Fluid as they make this lubricating Matter to be; and likewiſe we always thought that Glands which are the moſt minute of any in the Body, would not ſeparate a Fluid of that Conſiſtence from the Blood: And how ſuch a Fluid can be ſecreted to nouriſh and lubricate the Nerves I know not, except it be by ſome *occult Quality*.

We have inſerted theſe Notions of ſome of our modern Anatomiſts and Philoſophers, juſt to prove that they are built upon a ſandy Foundation, and not to be truſted to; and now we will proceed to reſolve our Propoſition, *i. e.* to prove that the Motion of the Muſcles is performed by an elaſtic Fluid which moves through the nervous Tubes, and contracts and reſtores the nervous Fibrillæ againſt the Force of the circulating Blood.

THAT the cortical Subſtance of the Brain is glandulous, and contrived for ſecreting a fine Fluid from the Blood, and that this fine Fluid is made yet more fine and rare by the medullary Subſtance, which is a Heap of the moſt minute Glands in the Body, and likewiſe, that the Nerves take their Original from this latter Order of Glands in numberleſs ſmall Pipes or Tubuli, is plain Matter of Fact, and confirmed by the concurrent Obſervation and Experience of all our ingenious Anatomiſts: And that ſuch a Fluid as we have here propoſed may be ſeen to flow from a Nerve when it is cut, only much more condenſed by the Cold and for Want of Motion, is equally true, and in Fact undeniable. Now we find by conſtant Experience, that by the Power of the Will we can move the Muſcles of any Part of our Body, (except thoſe which are involuntary,) with various Degrees of Force; that there is not the leaſt ſenſible Difference in Point of Time between willing the Motions of the Muſcles, and the Motions themſelves; that Muſcles contracted by the Power of the Will, dilate again immediately after the Soul ceaſeth to exerciſe that Power; and the Soul loſeth the Power of moving the Muſcles, and of perceiving Pain from Wounds in any Part, when the Nerves of that Part are cut aſunder, tied, or entirely obſtructed in any other Way. From whence it will plainly appear, that the Nerves are the Inſtruments whereby the Will gives Motion to the Muſcles: And it does this by ſome Agent which is ſent from the Brain, in which all the Nerves terminate, to the Part the Soul wills to move. The exceeding Quickneſs of this Motion paſſing from the Brain through the Nerves to the Muſcles in the moſt remote Parts of the Body in an Inſtant, and its Ceſſation the very Moment the Cauſe which produced it ceaſes to act, plainly ſhews it to be the vibrating Motion of an elaſtic Fluid which is very fine and ſubtil; for it is the Nature of the vibrating Motion of an elaſtic Fluid to be very ſwift, and to ceaſe the very Inſtant the Cauſe which produced it ceaſes to act. Now we will ſuppoſe this elaſtic nervous Fluid to be no rarer than our Air, yet it will anſwer the Intentions we have attributed to it: For a vibrating Motion excited in our Air by the Tremors of Bodies

dies for the Production of Sounds, has been found to move at the Rate of 1140 Engliſh Feet in the Second of a Minute, and ceaſes immediately after the Tremor of the Bodies ceaſes. Now if the vibrating Motion of the nervous Fluid is no ſwifter than that of Air, and the moſt remote Muſcle in the Body is ſix Feet from the Brain, it muſt move, by the Command of the Will, to that Muſcle in the 200 Part of a Second, nearly, which is a Time inconceivable.

When, by the Power of the Will a vibrating Motion is excited in this elaſtic nervous Fluid, in thoſe Ends of the Nerves which terminate in the Brain; that Motion is inſtantly propagated, through theſe minute Tubes, to the Nerves of the Muſcles, and excites a like Motion in them, by which their Nerves will be contracted, and conſequently the fleſhy Fibres, which are dependent thereon, will likewiſe be contracted, and that with a ſpaſmodic Contraction, if the Force of the circulating Blood and the antagoniſt Muſcles did not counteract. And thus when the Muſcle is in a State of Contraction, it draws the Parts to which its Extremities are faſtened. Thus the Limbs and other Parts of the Body are moved by their Muſcles, each of which has two Ends faſtened to two Bones, whereof one is more moveable than the other; upon which Account, when its fleſhy Fibres are ſhortened by Contraction, the more moveable Bone is drawn towards that which is more fixed, by Means of an intervening Joint which it turns upon.

IMMEDIATELY as the Will ceaſes to act, this vibrating Motion of the nervous Fluid ceaſes, and when the vibrating Motion of this Fluid ceaſes; the Nerves of the Muſcles ceaſe to be contracted, and conſequently their fleſhy Fibres; and when theſe ceaſe to be contracted, the Muſcle will be dilated as before.

COROLLARY I.

THE Blood moving through the Muſcle is preſſed forward by the Force of its Contraction; but by its expanſive Force it prevents the Fibres from being drawn into too great Contraction by the Nerves. But when a Muſcle is contracted, if it be kept in that State by the conſtant Action of the Force which contracted it, leſs Blood will flow through it in a given

Time than did before: For the Blood Veſſels which are interwoven in the Muſcle, are compreſſed and contracted, and conſequently their Diameters leſſened: So that this Contraction of the Muſcle, while it is exerting, forces the Blood forward; but during its Contraction hinders the Blood from flowing through the Muſcle in the Quantity it did before. Hence a gentle Motion of the Muſcles accelerates the Motion of the Blood; but a ſpaſmodic or convulſive Motion retards it.

COROLLARY II.

The Forces of correſponding Muſcles, in healthful Bodies are meaſured by their Weights, and the Strength of the vibrating Motions of the nervous Fluid in them, taken together. And if a great Increaſe of the vibrating Motion of the nervous

Fluid in the Nerves of one Part of the Body be, from ſome accidental Cauſe, attended with a Diminution of its vibrating Motion in the Nerves of other Parts; in this Caſe it is certainly in the Power of Art to decreaſe that ſtrong vibrating Motion in one Part, and raiſe it in another: As Bliſters, Cauteries, and all other ſtimulating Bodies, applied to one Part of the animal Body, for the moſt Part relieve Pain, and allay convulſive Motions in its other Parts.

PROP. IV.

To determine the Force of the Air upon the Blood in Breathings, and likewiſe the Effects it produces upon the Blood in the Lungs.

But before we enter on this Head, it will be neceſſary for us to give a Deſcription of this Organ, as I think its Structure and Uſe cannot be too nicely enquired into. The Lungs are ſituated in the Middle of the Cavity of the Thorax, and are divided into two Lobes by the Mediaſtinum. The Figure of both Lobes together reſembles in Shape a Cow's-foot, being a a little concave between the two Lobes, where they embrace the Heart, and behind where they lye upon the Vertebræ;

but before, where they touch the Sternum and Ribs, they are convex. The Lungs of a Fœtus is the Colour of Blood, *i. e.* of a pale Red; but immediately after the Air enters them, they change their Colour and become pale, though in Adults they are variegated both with the one and the other. They are tied to the Sternum by the Mediaſtinum before, to the Vertebræ by the Pleura behind, and very often to the Pleura, where it covers the Ribs, in the Left Side, eſpecially after a Pleuriſy. The Lobes of the Lungs are covered with a double Membrane; the External, which is a Production of the Pleura; and the Internal, which not only covers the Subſtance of the Lungs, but its internal Lamina alſo fills up the Interſtices which are between the Bunches of its ſmall Lobes, with little veſicular Cells. The immenſe Number of fine Veins and Arteries, which run upon this Membrane, makes it appear almoſt like a Net-work of them. The Subſtance of this Organ is compoſed of a very great Number of little Lobes of various Figures and Magnitudes; but their Surfaces are ſo adapted to one another as to leave but very few Interſtices. Each Lobe of the Lungs is divided into a great Number of Lobules: And each Lobule contains within its own Membrane, an infinite Number of ſmall and little orbicular Veſicles, which leave ſmall Interſtices between them, that are full of little Membranes, like thoſe which tie the Lobes together. The Extremities of the Branches of the Wind-Pipe open into the Cavity of the Veſicles, which are properly formed by its Membranes; but the ſmall Blood-Veſſels ſpread themſelves upon theſe Membranes like a Net, with frequent and large Inoſculations.

The Veſſels which enter the Lungs, are the Aſpera Arteria, by which we draw in the Air; the Arteria Pulmonalis, which comes from the right Ventricle of the Heart; and the Vena Pulmonalis, whoſe Trunk opens into the left Ventricle of the Heart. Each of theſe great Veſſels divides into two Branches, for the two great Lobes of the Lungs, where they are ſubdivided into an infinite Number of minute Branches. As to every little Lobe or Veſicle in the Lungs, there is a Branch of each of theſe great Veſſels; and the Branch of the Aſpera Arteria is always between the other two.

Thus having given an Account of the Structure of the Lungs and its Veſſels, we will now proceed to account for the Force of the Air upon the Blood in Breathing; and here we will follow the Example of our ingenious Countryman Dr. *Keil*, who very accurately calculated the Quantity of this Force by rational Experiments.

For this Purpoſe we got a Bladder of an oblong Figure, which, being tied at both Ends, was very much like to a cylindrical Figure: At one End of it we fixed a Pipe, and to the other End we faſtened a Weight; this done, we faſtened the Pipe at ſuch a Diſtance from the Ground, as juſt allowed the Weight to reſt upon it; we then found with a very eaſy Expiration we could raiſe 10 Pounds Weight. And with the greateſt Expiration we could raiſe 32 Pounds Weight. From whence we may conclude that the Air driven out of the Lungs in the moſt eaſy and ſtrong Expirations was capable of raiſing each of the aforeſaid Weights.

BUT as the Preſſure of the Atmoſphere upon the Bladder, being fixed, is equal almoſt to five Times the Weight it can raiſe, becauſe the upper Part of the Bladder reſiſts the Force of the Air, juſt as much as the Weight at the other End; and as the Air preſſes every where equally, the whole Preſſure will be to that Part of it which preſſes upon the Orifice of the Pipe, as the whole Surface of the Bladder is to the Orifice of the Pipe, which we calculated to be as 160 to 1. Therefore as 160 : 1 :: 20 double the leaſt Weight raiſed, to $\frac{160}{20}$ which is juſt 2 Ounces, and in raiſing the greateſt Weight it is 5 Ounces. Theſe therefore are the Forces by which Air is forced out through the Aſpera Arteria in an eaſy and ſtrong Expiration. Now we will conſider the Lungs as a Bladder, and the Larynx as the Pipe of the Bladder; then the Preſſure upon the Orifice of the Aſpera Arteria when the Air is driven out, is to the Preſſure upon the Lungs, as the whole Surface of the Lungs is to the Orifice of the Aſpera Arteria. Now we will with Doctor *Keil*, put 5, for the Diameter of the Larynx, then its Orifice will be 0.19. Then we will ſuppoſe the Lungs to be two Bladders, whoſe Diameters are each 6 Inches, and their Surfaces 113 each, or the Surface of the Lungs to be 226; therefore the Preſſure upon the Larynx will be to the Preſſure upon the whole Surface of the Lungs as 0.19 to 226, or as 1 to 1189. And if in a ſmall Expiration the Preſſure upon the Larynx is 2 Ounces, the Preſſure upon the whole external Surface of the Lungs will be 148 Pounds; and the utmoſt Force, when the

Preſſure upon the Larynx is 5 Ounces will be equal to 370 Pounds Weight. But as the Subſtance of the Lungs is not like an empty Bladder, where the Air acts by Preſſure only upon its Surface; for every Lobule of this Organ is full of Veſicles, upon the Surface of each of which the Air preſſes, with an equal Degree of Preſſure, as it would upon the Surface of an empty Bladder, of the ſame Magnitude; and if we would diſcover the whole Preſſure of the Air upon this Organ, we muſt likewiſe calculate its internal Surfaces. To accompliſh this we will compute only the $\frac{1}{3}$ Part of this Organ to be filled with theſe Veſicles, where we ſuppoſe the chief Preſſure upon the Blood-Veſſels is to be made, (although it is certainly more) now we have calculated both Lobes of the Lungs to contain 226 Inches, the $\frac{1}{3}$ of which is 75 Inches, which is the Part that is full of theſe Veſicles. Now let us with Dr. *Keil*, make the Diameter of each Veſicle to be $\frac{1}{59}$ Part of an Inch, (which muſt certainly be more) then its Surface will be 001256, and the Solidity 0000043, by which Sum if we divide the Space allowed for theſe Veſicles or 75 Inches, we ſhall have 17441860, the Number of Veſicles in both Lobes of the Lungs. And if we multiply the Number of the Veſicles, by the Surface of one Veſicle, the Product will give 21906,976, the Sum of the Surfaces of all the Veſicles in this Organ. And then the Preſſure upon the Larynx, will be to the Preſſure upon the whole Surface of the Lungs, as 0,19 is to 21906.976. Therefore when in an eaſy Expiration the Preſſure upon the Larynx is two Ounces, the Preſſure upon the whole internal Surfaces of the Lungs will be 14412 Pounds Weight; and when in a ſtrong Expiration the Preſſure upon the Larynx is five Ounces, the Preſſure upon the whole internal Surface of this Organ will be 36030 Pounds Weight. Though this prodigious Weight may ſeem incredible, yet we are here to underſtand, that the Preſſure upon each Part of the internal Surface of the Lungs is not greater in any Part, than is the Preſſure upon the Larynx, and that this immenſe Preſſure we have attributed to it ariſes from the prodigious Extent of the Surface of the Veſicles of this Organ.

From the Structure of the Lungs, and the immenſe Preſſure of the Air upon them, may be plainly deduced the great Effects they produce upon the Blood: For, whilſt the Fœtus is in the Womb, the Veſicles of the Lungs lying flat upon one another, compreſs all the minute Blood-

Veſſels which are ſpread upon them: But, as ſoon as the Child is born, the Air, by the Dilatation of the Thorax, is thruſt into the Branches of the Trachea Arteria, where, by its great Preſſure, it blows up the minute Veſicles into Spheres; by which Means, the Preſſure being taken off from the Blood Veſſels, and they equally expanded with the Lungs, all the Blood has a free Paſſage through the pulmonary Artery; but when the Air is thruſt out again by the Contraction of the Cavity of the Thorax, it being a fluid Body, compreſſes the Veſicles and Blood Veſſels upon them every where equally; and by this Compreſſion the Globules of the Blood will receive the whole Force and Energy of the Air, and be broke into ſmaller Parts, fit for Secretion and Circulation. But, though theſe are neceſſary Conſequences of

Reſpiration, yet it may be very plainly proved, that ſome Particles of Air do enter the Blood Veſſels, and mix with the Blood in the Lungs: As, thus, when Air is ſhut up in a Bladder and ſunk under Water, ſome of that Air will eſcape the Pores of the Bladder, when only compreſſed by the Weight of the Water, into which it is ſunk; and if the Weight of the Water will force ſome Particles of it through the Pores of the Bladder, certainly the prodigious Preſſure of the Air upon the Lungs muſt force ſome Particles of it into the Blood Veſſels.

And farther it may be proved by the Air-Pump, that Animals cannot live when ſhut up in common Air, though it ſtill retains its wonted Preſſure. And likewiſe that Inſtrument ſhews us, that Animals will live longer when ſhut up in compreſſed Air; and, that, when an Animal is dying in common Air, it may be much revived by preſſing in more freſh Air. Likewiſe ſome Particles of Air may be ſeen to ariſe from the Blood, when drawn off from the Vein, and immediately put into the Air-Pump, and the Air drawn off. And, as we have proved before, the Particles of Air are expanded and rarefied by Heat, which is the Action of Fire; and Fire is excited and put into its moſt violent and rapid Motion by the Expanſion of the Air: Therefore we may likewiſe conclude that this Action of the Particles of the Air, upon the fiery Particles of the Blood, muſt likewiſe greatly increaſe its centrifugal Force; and conſequently leſſen its attractive coheſive Force, and prevent its Globules from running into too cloſe Contacts, and thereby greatly conduce to keep this Fluid in a proper Degree of Fluidity, when it circulates through the Capillary Veſſels.

But when this Fluid circulates in the larger Veſſels which are near the Heart, it has yet another Cauſe to prevent the Union of its Particles; for a Fluid moves through a cylindrical or conical Veſſel (ſuch as are the Arteries) with a greater Velocity at the Axis than at the Sides. And all Fluids when they are preſſed, preſs again with the ſame Force upon the Body that preſſed them. The Blood therefore is thruſt into the great Artery by the whole Force of the Heart, by which Means this Fluid preſſes upon the Arteries, and conſequently dilates them; and as the Sides of the Arteries are elaſtic, when they return, they not only preſs the Blood forward, but every way, and conſequently muſt produce an inteſtine Motion, and, as we have proved before, hinder the Attraction of its Particles; and by this frequent and ſtrong Colliſion of the Particles of this Fluid, againſt the elaſtic Sides of the great Arteries, the Coheſions of the Particles, if any of them happen to cohere, will be broke and diſſolved. And, again, as this inteſtine Motion muſt greatly increaſe by a great many of the Particles of the Blood being Elaſtic; ſo by this Reſiſtance of the elaſtic Sides of the Veſſels, they muſt be forced one againſt another, and, by being Elaſtic, reflect from one another, and conſequently greatly increaſe the inteſtine Motion of this Fluid.

COROLLARY.

Upon this inteſtine Motion of the Blood depends its Heat, which therefore muſt be every where proportional to the Action of the Particles againſt the Sides of the Veſſels, and the Sides of the Veſſels againſt the Particles, ſuppoſing the Elaſticity of the Particles every where the ſame. Now this Action of the Particles againſt the Sides of the Veſſels, and the Sides of the Veſſels againſt the Particles, decreaſes, in Proportion as the Sum of the Cavities of the Veſſels increaſes; and, therefore, where the Sum of the Cavities of the Veſſels is greateſt, the inteſtine Motion and Heat of the Blood will be leaſt, and the attractive Force of its Particles the greateſt.

PROP. V.

The Blood-Veſſels of a particular Part of the Body being obſtructed, or contracted, or opened, or dilated; determine the Degrees of Velocity of the Blood, and Magnitudes of the Blood-Veſſels in all the other Parts of the Body.

When the Artery of any Part is obſtructed or contracted, ſo as to hinder the Blood from flowing through that Part, either wholly or in ſome Degree; the Velocity of this Fluid will be increaſed in all the other Parts of the Body, and its Increaſe will be greater or leſs according to the Magnitude of the obſtructed or contracted Artery.

The Blood-Veſſels of the Part whoſe Artery is obſtructed or contracted will contract and their Diameters decreaſe, from their loſing their proper Quantity of Blood, which, before the Obſtruction or Contraction of their Artery, kept thoſe Veſſels diſtended: And the Blood-Veſſels of all the other Parts of the Body will ſwell and grow larger, by the increaſed Velocity, and Quantity of their Blood; and their Dilatation will be greater or leſs, in Proportion as the Quantity and Velocity of their Blood are increaſed. The ſame may be underſtood if only a Branch of an Artery of any Part be contracted or obſtructed; becauſe ſuch Obſtruction or Contraction will always leſſen the Quantity of the Blood in the ſmall Veſſels it furniſhes with this Fluid, and conſequently will increaſe its Velocity and Quantity in the other Parts of the Body.

But when the Artery of any Part is opened, or dilated, the Blood will flow faſter into that Artery, becauſe it meets with the leaſt arterial Preſſure or Reſiſtance there; and, by the Force of the Heart and elaſtic Sides of the Arteries, this Fluid will always be forced in the greateſt Quantity upon Parts where it meets with the leaſt Reſiſtance, and move ſlower into all the other Parts of the Body than it did before; and the decreaſed Quantity and Velocity of the Blood in the other Parts will be greater or leſs, *cæteris paribus*, as they are nearer to or farther from the Artery which is opened or dilated.

If an Artery is opened, and the greateſt Part of the Blood which flows into it flows out of the Orifice, the Veſſels, which that Artery furniſhes with Blood, will contract and grow leſs, from their not receiving a ſufficient Quantity of Blood to keep them diſtended. And the Veſſels of all the other Parts of the Body will likewiſe be contracted, and their Diameters decreaſed, from a Decreaſe of the Quantity, and Velocity of the Blood in them; and this their Contraction will be greater or leſs, in Proportion as they are nearer to or farther from the Artery which is opened. When the Coats of the Artery are relaxed or dilated, all the Veſſels which that Artery furniſhes with Blood, will be diſtended and grow larger, contrary to what happened to them when that Artery was opened. The ſame may be obſerved, proportionally, when, inſtead of the great Artery of the Part, one or more of its Branches are opened or dilated.

When, inſtead of the Artery, the Vein of any Part is obſtructed or contracted, the Blood will then be totally or in a great Meaſure hindered from flowing out of the Part; whereby its Veſſels will immediately be diſtended, by the increaſed Quantity of the Blood, 'till the Force of the Blood will diſtend them no farther; afterward, if leſs Blood flow into the Artery of the Part, from the great Reſiſtance it meets with, than did before; the ſame Changes in the Velocity and Quantity of the Blood in the other Parts of the Body, will be produced as were produced in them by the Obſtruction or Contraction of the Artery, as we have obſerved before.

When the Vein of any Part is opened or dilated, the Blood flows faſter through the Part than it did before; becauſe the

Orifice, or Dilatation of the Vein, will greatly leſſen the Reſiſtance ariſing from the Blood which lies before it: The Velocity will thereby be increaſed in the Artery, and conſequently diminiſhed in all the other Veſſels of the Body; and the decreaſed Quantity of the Blood in theſe Veſſels, and the Diminution of their Diameters conſequent thereon, will be greater or leſs, proportionally as the Veſſels are nearer to or farther from the Part whoſe Vein is opened or diſtended.

SCHOLIUM.

From our foregoing Obſervations it will plainly appear, that if any Part is overloaded with Blood, the ſpeedieſt Method of relieving it will be by opening the Veſſels of the Part itſelf; and next, the Veſſels of the Parts which are the neareſt to it. And likewiſe if the Blood flows too faſt into any Part, from an Opening or Diſtention of its Veſſels, this increaſed Velocity of the Blood into the Part will be relieved by increaſing the Velocity of this Fluid through the other Parts.---If the Blood flows too ſlow into any Part, from an Obſtruction or Contraction of its Blood-Veſſels, the Motion thro' this Part will be increaſed by relaxing, and forcing open the Obſtructions of the Veſſels.

PROP. VI.

To explain the Nature and Uſe of the Secretion of the animal Fluids.

THE Secretion of the animal Fluids is that Separation of them one from another which is performed by the Glands; and to give a rational Deſcription of this important Piece of medicinal Knowlege, it will be neceſſary for us to range it under the three following Heads.

FIRST, THE different Diameters of the Orifice of the ſecretary Ducts: For it is very well known that all Particles whoſe Diameters are leſs than thoſe of the Ducts, will enter; but thoſe Particles whoſe Diameters are greater than are thoſe of the Ducts, will be reſiſted; inſomuch that any

Matter may be evacuated by any of the Glands, if the Diameters of its Particles be made leſs than are thoſe of the Ducts by which it is to be evacuated, either by the Diviſibility of the Matter to be ſecreted, or by an Enlargement of the ſecreting Paſſages.

Secondly, The different Angles which the ſecretory Duct makes with the Trunk of the Artery: for Fluids do always preſs the Sides of their containing Veſſels in a Direction perpendicular to their Sides; which may be plainly proved by the Pulſation of the Arteries, ſince 'tis to that Preſſure that the Pulſation is owing. It is likewiſe very plain that the Blood is driven forward by the Force of the Heart: ſo that the ſecretory Motion is compounded of both theſe Motions. And it is very certain that the lateral Preſſure is moſt when the Velocity of the Blood is greateſt; but not in Proportion to that Velocity; for the lateral Preſſure is very conſiderable when the Fluid is at Reſt; being then in Proportion to the Denſity of the Fluid. And in a Fluid like the arterial Blood, which is thrown in a right lined Direction, or in a Direction parallel to the Axis of the Artery, the lateral Preſſure will be in a compound Proportion to both; and conſequently if two Particles of equal Diameters but unequal Denſities, do arrive with the ſame Degree of Velocity at an Orifice capable of admitting them, yet they will not both enter it, and be forced through, becauſe their Motion of Direction will be very different. So that the Angle the ſecretory Duct makes with the Artery is highly neceſſary to be known in accounting for animal Secretion, even ſuppoſing their Diameters and Figures to be the ſame.

THIRDLY, The different Degrees of Velocity with which the Blood arrives at the Orifice of the ſecretory Ducts. For, ſince all the animal Secretions are made a Fluid, we can aſſign no other Reaſon, why one Part of the Body is of a ſoft looſe Texture, and another Part of a more denſe Texture, but this different Degree of Velocity of the Blood at the Orifice of the ſecretory Ducts; whereby the ſecreted Fluids are driven or forced into the Parts fit for their Reception with a greater or leſs Force. — And when we conſider the Blood as an heterogeneous Fluid whoſe component Parts are of different Denſities, upon its Stagnation it will precipitate its heavy, and elevate its light Parts, and they all in Time will take their Places according to their ſpecific Gravity; and where the Fluid does not ſtagnate, the Separation of the heavy Parts from the Light, will be in Proportion to its Degree of Motion: Then conſequently the ſlower the Blood's Motion is, the more of its ſpecifically lighter Particles, or ſerous Parts, will be ſeparated. And the Viſcidity of the ſeparated Fluid will be in Proportion to the Velocity of the Blood at the Orifice of the ſeparating Canal, and the Velocity of the Blood at the Orifice of the ſeparating Canal, will be as the Number of Plications in the complicated Artery, conſequently the Viſcidity of the ſecreted Fluid, will be as the Number of Plications in the complicated Artery. But we ſhould likewiſe obſerve that as a Gland is nothing elſe than a complicated Artery which ſends excretory Veſſels out of its Sides, and afterwards degenerates into a Vein; when its Coats are relaxed, a greater Viſcidity of the ſecreted Matter will enſue, and *vice verſa:* For the ſecreted Matter will grow more denſe by ſtaying longer in the

Gland; and its moſt fine Parts will be evaporated by the Heat of the Body, and conſequently the reſt will be more viſcid.

GLANDS, which are of the conglomerate Kind, have Coats made of muſcular Fibres, and force out their Contents by Contraction; and conſequently the ſtronger the Muſcular Fibres are, the greater will be the Quantity and Velocity of the ſecreted Matter. Therefore whatever makes a univerſal Relaxation of the muſcular Fibres will increaſe the Denſity of the Matter ſecreted in the conglomerate Glands.

WHEN we would know the Quantity of a Fluid which is ſeparated in any Gland, we muſt firſt know the Velocity and Quantity of the Blood at the Orifice of the Gland, together with its Denſity, and the Largeneſs of the Orifice of the Gland. For the Celerity of the Blood's Motion, the Largeneſs of the Orifice, and the Denſity of the Blood being given, the Quantity ſecreted muſt be as the Quantity of the Blood directly; for the greater the Quantity of the Blood, the greater will be the Quantity ſecreted, and the leſs the Quantity of Blood, the leſs will the ſecreted Matter be. The Quantity of Blood, its Denſity, and the Wideneſs of the Orifice being given, the Quantity of the ſecreted Fluid will be directly as the Celerity; and the greater the Celerity, the greater will the Quantity of the ſeparated Matter be, and the leſs, the Celerity the leſs. The Quantity of the Blood, its Celerity, and Denſity being given, the Quantity ſeparated will be directly as the Largeneſs of the Orifice; for the larger the Orifice, the more will be ſeparated, and the leſs, the Orifice the leſs. The Quantity and Celerity of the Blood, and the Wideneſs of the Orifice being given, the Quantity ſeparated will be reciprocally as the Viſcidity of the Blood; for the greater the Viſcidity, the leſs will be the Quantity of the ſecreted Matter, and the leſs the Viſcidity, the more: And when none of theſe are given, the Quantity ſecreted will be as the Quantity of the Blood.

BUT laſtly, The Quantity of the ſecreted Matter may likewiſe vary from what we have aſſerted, by the Blood having been more or leſs drained of its lymphatic Particles before in other Glands. Of this we have a very ſtrong Inſtance, in the Secretion of the Bile in the Liver; and as this is a very material Thing to be known by all Practitioners of Medicine, we will give a thorough Deſcription of this curious Apparatus.

'Tis very well known to all Perſons who ever obſerved this Organ, or knows an Artery from a Vein, that the Order Nature takes to furniſh this Organ with Blood is very extraordinary, and different from the Method ſhe takes to furniſh all the other Secretions with this Fluid: all the other Secretions receive their Blood from the Arteries, but this from the Veins.

The Blood, with which this Organ is furniſhed, is, by the Arteries, diſperſed through the Inteſtines, Caul, Meſentery, Pancreas, Spleen, Stomach, and Gall-bladder, and by the correſpondent Veins returns, which uniting in a large Trunk, is commonly called the Vena Porta. The Blood after this large Circuit is brought to the Liver, and divided through its whole

Subſtance by the minute Branches of this large Trunk, which, with Reſpect to this Organ, performs the Office of an Artery. From theſe minute Branches of this Veſſel is the Bile ſecreted by the ſmall ſecretory Ducts of this Organ, after the ſame Manner as the other Secretions are ſeparated from the Arteries, in all the other Glands. Now we ought greatly to admire this extraordinary Method Nature takes to furniſh this Organ with Blood:

FIRST, From the numberleſs Veſſels it paſſes through before it arrives to its deſtined Place.

AND ſecondly, From the Nature of theſe Veſſels, and the Changes it undergoes.

IN the firſt Place we ſhould obſerve, that all the minute Veſſels, through which the Blood paſſes before it comes to the Liver are abundantly ſtocked with Glands; thro' which a very great Part of its lymphatic Particles muſt be drawn off, before it can enter the Porta, to be conveyed to the Liver. And when we conſider the Nature of theſe minute Arteries diſperſed every where thro' the Abdomen, and the great Number of ſecretory Veſſels with which thoſe Parts abound, we muſt conclude that the Blood, from the continual Drain of theſe ſecretory Veſſels, muſt be deprived of a great Quantity of its fine lymphatic Particles before it arrives to its deſtined Place: And from this it will plainly appear, that this large Drain of Lymph in theſe Veſſels, is to prepare the Blood for the Secretion of the Bile in the Liver. This Aſſertion will be much confirmed if we conſider the Nature and Uſe of the Spleen, and what is performed there to the ſame Purpoſe, and with the ſame Deſign as already mentioned.

The Spleen is a large, ſoft, and ſpongy Bowel, ſituated in the left Hypocondrium, between the Stomach and Baſtard Ribs; conſiſting of a large Contexture, and Congeries of Blood Veſſels, Nerves, and Lymph Ducts. I cannot exactly determine the preciſe Dimenſions of the ſplenic Artery, but it is known that the Circumference of the cœliac Artery does not, in a middle ſized Man, exceed half an Inch, or .5, and conſequently its Square is .25; and therefore the Square of the ſplenic Artery, which is a Branch of it, cannot be above .18. Now the Dimenſions of the Spleen in a middle ſized Man, are ſix Inches in Length, three in Breadth, and two in Thickneſs. But we will with Dr.

Keil, compare it to a Cylinder of two Inches Diameter, and therefore the Square of its Circumference will be 36, which being divided by the Square of the Circumference of the Splenic Artery, the Quotient will be 200; ſo that the Blood moves 200 Times ſlower in the Spleen, than in the Beginning of the Splenic Artery. And when we conſider the great Quantity of Glands which are contained in this Organ, and the great Quantity of the Lymphatic Particles, of the Blood which muſt be ſecreted by them, the Uſe of this Organ will be very eaſily accounted for.—— From all this Art and Contrivance it is very plain, that the Intent of this Organ is to diminiſh the Velocity of the Blood, and to ſeparate a proper Quantity of its Lymphatic Particles. And that ſuch a ſlow Motion, and Drain of this Fluid, is abſolutely neceſſary for the ſecerning of the

Bile in the Liver, is very evident; for ſuch a viſcid Secretion, and a Secretion which is replete with Oil and volatile Salts, as the Gall is, could never have been ſeparated from the Blood, except its Lymphatic Particles had been in a great Meaſure ſeparated, and its Motion abated. For if the Fluids which are ſeparated from the Blood by the Glands are at all Times and Places the ſame in the Blood, and not formed after the Manner demonſtrated, what Need was there for diminiſhing ſo conſiderably the Velocity of the Blood? Let the Blood move faſt or ſlow, they would be always the ſame, and always in an equal Aptitude to be ſecerned.

This Secretion is certainly the moſt uſeful of any in the Body: and the drawing off a Liquor from the Blood in ſo ſmall a Quantity as is here drawn off, and which is endued with ſo many important Qualities, neceſſary to animal Life, is certainly very wonderful. For this Secretion is a potent Diſſolvent, a very good Precipitant, and a very benign Cathartic. The Bile is well known to be the Refiner and Purifier of the Chyle, the Cleanſer and Strengthener of the Primæ Viæ; and when this ſalutary Secretion is either not made in the Liver, or obſtructed in its Paſſage, ſo that it cannot be mixed with the Chyle in a proper Quantity, all the animal Fluids are preſently tending to Corruption, Putrefaction and Stagnation.

We ſhould yet farther obſerve one Thing, which is of the utmoſt Conſequence to be conſidered and explained with Reſpect to glandular Secretion; and that is, the Nature and Uſe of the Lymph, or explain the Reaſon of the large and continual Secretion of the lymphatic Particles from the Arteries, which are returned again upon the Blood in the Veins. And as this is a very curious Phænomenon and very eſſential to be known by all Practitioners in Medicine, we will here give a Deſcription of it.

But preparatory to this, it is neceſſary to remark, that the Heat, Fervor, and Activity of the Blood, do for the moſt Part reſide and are retained in the globulous Part, and in that Part of the Serum which has the ſtricteſt Union with it; as theſe are the Parts which are the moſt plentifully ſaturated with volatile Salts and Oils, and conſequently conſiſt of the moſt ſubtile and active Parts of this Fluid. But the lymphatic Particles of this Fluid, which freely and univerſally paſs through the Glands, are much finer and thinner, and plainly appear to be a cooling diluting Fluid, which ſerves to cool and abſorb the active Particles of the Craſſamentum, eſpecially when the Velocity, and conſequently Heat, of this Fluid is increaſed.

These lymphatic Particles therefore, to prevent their being coagulated by the Heat of the Craſſamentum in the Arteries, are continually ſecreted off thro' the lymphatic Glands; and after they have been carried about in the lymphatic Veſſels with a ſlow Motion, whereby they may be cooled and ſomewhat condenſed, they are again returned upon the Blood in the Veins, by which that Fluid is cooled and diluted, and its natural Heat preſerved; which otherwiſe would be continually increaſing, and ſoon become unfit for the Purpoſes of the animal Oeconomy.

AND that this is the true Intention of the circulating Lymph, will plainly appear, when we conſider the State of the Body in Fevers, where the lymphatic Secretions are retarded, and theſe Particles kept to circulate with the arterial Fluid. Here, by the Heat and Rarefaction of the whole Craſſamentum, the Blood-Globules are enlarged, and conſequently their attractive Force increaſed, whereby they attract and retain a greater Quantity of the Particles of the ſerous and lymphatic Parts, and the remaining Parts of this Fluid coagulates with the Heat, and ſtrongly adheres to the Craſſamentum or globulous Part: In this Caſe all the Secretions, particularly that of the Lymph, muſt of Courſe be diminiſhed, and, in Proportion to their Diminution, will the

Heat of the Blood always increaſe, 'till by cooling and diluting Medicines, and Regimen, the Rarefaction is again allayed, the Particles of the Lymph diſſolved and diſpoſed to ſeparate from the Blood-Globules, and the lymphatic Secretion, and Circulation again take Place, whereby the Fever ſoon ends, and the Blood returns to its natural Heat.

PROP. VII.

The expurgatory Secretions always increaſe by Exerciſe and Watching, and decreaſe by Reſt and Sleep: But, on the contrary, the Secretions of the lymphatic Juice are leſſened by Exerciſe and Watching, and increaſed by Reſt and Sleep.

This will appear plain to any Perſon who is acquainted with the Nature of theſe Diſcharges; the moſt conſiderable of which are the Fluids which paſs off by Perſpiration and Urine, and to which all the others bear but a ſmall Proportion.

Now daily Experience teaches us that both theſe great Evacuations are conſiderably increaſed by Exerciſe and Waking, and conſiderably decreaſed by Sleep and

Reſt. The learned *Sanctorius* has very plainly demonſtrated this, as hath likewiſe our ingenious Countryman Dr. *Keil*, who muſt be ſuppoſed to ſurpaſs *Sanctorius* in this Particular, and his Obſervations to be more juſt and correct, eſpecially for the Inhabitants of this Iſle. This Gentleman made his Obſervations near about the Middle of this Kingdom, and obſerved the ſeveral Degrees of Heat and Cold through a ſucceſſive Courſe of ten Years. He plainly proves, that though the forementioned Diſcharges may be increaſed or decreaſed by the different Degrees of Heat and Cold, and by the irregular Uſe of the Non-naturals; yet in a mean Proportion and when the Body is in a healthful State, the Quantity of Perſpiration which paſſes off by Day is to the Quantity of it which paſſes off by Night, as 3 to 2 nearly: *i. e.* the Quantity perſpired in a given Time, when the Body is in a State of Inactivity and Sleep, is but $\frac{2}{3}$ of the Quantity which is diſcharged by this Evacuation, when the Body is in Action. This Gentleman has likewiſe proved that the Diſcharge by Urine is increaſed or decreaſed nearly in the ſame Proportion, under the foregoing Circumſtances with that of Perſpiration. From whence we may lay it down as a Fact, that theſe two expurgatory Secretions, being the moſt conſiderable of all thoſe Diſcharges, are decreaſed by Reſt and Sleep, and increaſed by Watching and Action.

It is known to every Body what ſurpriſing Effects may be wrought upon the human Body by Opium, *i. e.* Pain is eaſed, Reſt procured, a violent Flux of any of the expurgatory Secretions immediately abated, and the Patient, immediately after the taking of this Drug, feels ſuch an agreeable Senſation as Tongue cannot expreſs; But the Effects of this wonderful Drug, eſpecially this of leſſening the Diſcharge of the expurgatory Secretions, have been ridiculouſly attributed to ſome ſpecific or occult Quality in it. But I will venture to ſay that thoſe who maintain, or believe this Doctrine, may take it for a Fact that there is no Effect in this Drug, nor in any other material Subſtance in this Globe, but what they may comprehend the Cauſe of, if they will but give themſelves the Trouble to ſearch after it, and not build their Faith upon ſuch empty vague Notions.

BUT before we proceed any farther in reſolving our Propoſition, we will enquire into the Nature and Quality of this wonderful Drug, and endeavour to point out the true Cauſe of thoſe Effects it has upon the human Body.

Opium is the Juice of the African white Poppy Heads, which iſſues from Inciſions made in them, thickened in the open Air into a ſolid, but ſoftiſh, reſinous Gum; it conſiſts of,

First, A Gum, which is the Juice of the Plant condenſed by the Air.

Secondly, A Reſin, which is the oily Particles of the Plant likewiſe condenſed.

Thirdly, Some terreſtrial Feculencies, or the more groſs Particles of the former Juices, not perfectly refined by Circulation in the Plant.

THIS is Opium in its natural State; but when its Particles undergo that ſevere Torture, called a Chemical Analyſis, there may be extracted from it, firſt, a volatile alkaline Spirit, about $\frac{1}{3}$ Part of the whole. Secondly, a fœtid Oil, about $\frac{1}{9}$ Part of the whole; and thirdly, ſome terreſtrial Subſtances. This is Opium when tortured by Fire. Therefore we may conclude that the Virtues of Opium are owing to a volatile alkaline Salt, which is intimately mixed with a pungent aromatic Oil, and theſe inveloped in a more groſs Subſtance, or the terreſtrial Feculencies: And now let us conſider how this Medicine can have ſuch ſurpriſing Effects upon the human Body. And here we muſt obſerve that the great Effect, and upon which all the other Effects depend, wrought upon the human Body by this Drug is Sleep, or Reſt; and before we can properly explain how Opium cauſes Sleep or Reſt, we muſt endeavour to define diſtinctly what Sleep is, or what Difference there is between an animal Body, when awake, and when aſleep.

And firſt, then, we muſt obſerve, that Sleep is a Ceſſation from all voluntary Action, *i. e.* when we are awake we perform all Kinds of Motion by the Contraction of our Muſcles; but when aſleep, all theſe Muſcles, except thoſe appropriated to involuntary Motion, or to which the Mind has always given ſuch a conſtant Supply of Spirits, that it does it without the Aſſiſtance of any of the other Faculties, are in a Kind of Relaxation, or Looſeneſs, and all the antagoniſt Muſcles are in an Equilibrium and Equality of Action, not in the leaſt overpowering one another. For as the Parts are over-ſtretched by Exerciſe, ſo it ſeems to be the great Deſign of Sleep, to enable the over-ſtretched Parts to recover their former Elaſticity and Tone. We muſt next obſerve, that by Sleep there is not only procured a Suſpenſion from acting, of all our bodily Organs, except thoſe appropriated to involuntary Motion, but a Ceſſation from ſuch Thoughts as will diſturb the tranquil Scene. From hence we muſt conclude that the Motion of all the Fluids of the Body is even and regular, and conſequently, as we have obſerved before, all the minute lymphatic Secretions will be increaſed, and thoſe which depend upon muſcular Motion will be decreaſed. Hence alſo we obſerve that the Influx of the nervous Fluid into the Organs of the Body, and its Reflux to the Brain, is very inconſiderable in Sleep:

For 'tis muſcular Motion and Senſation, that cauſe the Influx and Reflux of this Fluid; but yet by the continual Supply being brought to the Brain of the arterial Fluid, it will be continually ſeparated there, and fitted to be inſtantaneouſly protruded thro' its minute Tubes.

FROM hence we may likewiſe obſerve that the Time of Watching is the Time of wearing out the Organs of the human Body; and the Time of Sleep is the Time in which they are repaired and recruited. For Action does always impair the Springs of the elaſtic Fibres, and waſte their Subſtance, which cannot be reſtored but by their being in a State of Inactivity, and by the regular and uniform Courſe of the arterial Fluid, which muſt conſequently follow. And from what has been ſaid it will plainly appear, that whatever produces ſuch a Diſpoſition of the Solids and Fluids of the Body as we have deſcribed will cauſe Sleep, and whatever hinders this State here deſcribed will hinder Sleep: Inſomuch that this is the only Means Nature has to preſerve the animal Oeconomy. And thus we ſee how neceſſarily continued Exerciſes make us ſleepy, as theſe weaken the Springs of the Fibres, greatly promote the expurgatory Secretions, and conſequently incline the Mind not to promote any more Motion, upon the Account of the Pain and Uneaſineſs, with which a too violent Attention of the Parts is always attended: Then certainly we muſt needs deſire to relax, or lie down to reſt.

It is a well known Obſervation, that when a Perſon has eaten a full Meal, he is very ſoon after inclined to ſleep. This Sleepineſs is certainly owing to a different

Cauſe, and comes near to the Effects of an opiate Medicine, therefore demands our Obſervation.

It is eaſily demonſtrated that Hunger is a diſagreeable Senſation cauſed in the Stomach, by the Juices of that Organ irritating its nervous Fibres, for want of other Matter to act upon; but as ſoon as theſe Juices have other Matter to act on, and prevent their irritating the nervous Coat of this Organ, this Senſation ceaſes: And when the Perſon has made a full Meal, the Coats of the Stomach will be diſtended, and, by the inteſtine Motion of the Aliments, gently ſtimulated and warmed; whence follows a delightful Senſation, which is accompanied with a ſmooth Undulation of the nervous Fluid towards the Brain; by which the Mind is ſo tranquil and eaſy, that it does not determine this

Fluid into the Organs of Motion, *i. e.* there is ſuch a Relaxation of the Muſcles, and ſuch a regular Motion of the Fluids, as we have before proved to be moſt conducive to Sleep. Beſides this, we muſt likewiſe obſerve, that when the Stomach is diſtended with Aliments, it preſſes upon the deſcending Trunk of the Aorta, and conſequently leſſens its Diameter, and thereby the Blood cannot flow ſo faſt as uſual through the deſcending Arteries, but its Quantity muſt be increaſed in the aſcending Arteries; whereby the Brain is loaded, and the Derivation of Spirits into the Nerves diminiſhed, and an Inactivity or Drowſineſs enſues.

Now we will proceed to point out the Cauſe of thoſe pleaſing Effects which Opium produces in the human Body. The firſt and moſt ſenſible Effect of Opium, when taken into the Stomach, is an agreeable Senſation, or very pleaſing ecſtatic Quietude. This pleaſing Senſation, is cauſed by the volatile Alkaline Salt, which is contained in the Opium, inveloped in a fine aromatic Oil, by which is formed a natural Sapo. Theſe, by lightly rarefying the Juices of the Stomach, and cauſing a pleaſant Titillation of its Veſſels, particularly of its nervous Coat, will produce an agreeable Plenitude, and a ſmooth Undulation of the Fluid of the Nerves towards the Brain, by which the Thoughts are thrown into ſuch a pleaſing Delirium, that the Mind is taken off from all other Objects and Concerns, to attend the preſent agreeable Impreſſion upon, and Undulations of, the Nerves. — Such an agreeable Senſation produced in the Stomach, with its Effects, we have before proved to be the Cauſe of Sleep; for this engages the Mind, and the Soul is, as it were, amuſed ſo that it does not think, nor exerciſe itſelf about any external Objects, but is inclined to reſt, and be tranquil.

In this agreeable State of ecſtatic Quietude, the Circulation increaſes, and the Blood moves uniformly through its containing Veſſels, by which the Pulſe beats more quick and ſtrong, the natural Heat is equally diffuſed, and the Blood gently rarefied: In Conſequence of which the Cervical and Carotid Arteries will be moderately diſtended with Blood, and thence preſſing upon the ſecretory Veſſels of the Brain, checks, and in ſome Meaſure hinders, the Derivation of the nervous Juice into the Organs of Senſe and Motion, and conſequently the Perſon is induced to a State of Sleep.

When the Quantity of Opium which is given is ſomewhat leſs than what is neceſſary to produce a ſound Sleep, it affects the Perſon only with a pleaſing Senſe, which makes him ſo tranſported that he cannot expreſs himſelf; he enjoys ſuch a perfect State of Indolence and Quiet, as no Happineſs in the World can ſurpaſs, and which he thinks is equal to Heaven. When Opium is given in yet a leſs Quantity, it ſerves only to ſtrengthen and animate the Perſon, and fit him for the ſtrongeſt of Exerciſes; as now its Operation is like that of a moderate Quantity of rich Wine, or any Sort of Liquor which is agreeably warming. And thus the Effects of this Drug may gradually increaſe, from cauſing a pleaſant Invigoration, to a deep Sleep; which Sleep, if the Opiate is taken in too large a Quantity, ends in an incurable Lethargy or Apoplexy.

The Cauſe of the Effects of Opium being ſuch, we may very plainly ſee by what Means this Drug eaſes Pains, or checks immoderate Evacuations. This is performed not only by diverting the Mind with a pleaſant Senſe, and withdrawing it from a diſagreeable one; but, as Pain is always attended with a Contraction of the Part, that Relaxation of the Fibres, which is now cauſed by the Effects of this Drug, eludes and deſtroys the Force of all Stimulus. The ſame may be obſerved in immoderate Evacuations, as there is for the moſt Part an Irritation of the Veſſels from which the Evacuation is made, the Removal of which will certainly abate the Diſcharge.

And in this lies the incraſſating Quality of this Medicine; for, when the ſharp Humour ceaſes to irritate the Veſſels of the Part upon which it falls, that diſagreeable Senſation, which before affected the Mind, will now be taken off; and conſequently the Mind will not uſe her utmoſt Efforts to throw off this ſharp Humour, and very often thereby occaſion Spaſms and convulſive Motions of the Part, but ſuffer it to lodge there in a greater Quantity, before it is ſo troubleſome as to be thrown off; for it is the ſame as if there was not any Irritation of the Part, if the diſagreeable Senſation thereof be not taken Notice of by the Mind.

THESE are the moſt general, and particular Effects of this Drug, in all Perſons and at all Times; and according to the Quantity taken at a Doſe, it greatly animates and ſtrengthens, eaſes Pain, raiſes a very agreeable Senſation, and at laſt ends in a ſweet Sleep.

From all theſe Obſervations we may plainly conclude, that all the expurgatory Secretions are leſſened by Reſt and Sleep, and increaſed by the contrary; and likewiſe the Secretions of the lymphatic Glands will be increaſed while the others are decreaſed, and decreaſed while the others are increaſed; as the leſs the Quantity of ſerous Particles are which are drained off from the Blood by the expurgatory Secretions, the greater will the remaining Quantity be which are to be ſecreted by the lymphatic Glands.

PROP. VIII.

To explain Digeſtion in its regular and natural, and in its irregular and unnatural Order.

VARIOUS have been the Opinions of the learned upon this Subject, and various groundleſs Notions have appeared in the World upon this Head; how much the Generality of Mankind may be ſatisfied with them I know not, but this I will aſſure my Readers that they are very unſatisfactory to me. The Error of a great many who have endeavoured to explain this Subject, hath lain in their attributing this Function only to one Cauſe, and excluding all other Cauſes which may be concerned therein: And this Cauſe ſome attribute to one Thing, ſome to another. The antient

Writers on Medicine attribute it to ſome ſpecific Quality in the Juices of the Stomach, and other ſuch nonſenſical Whims. Some of the Moderns, thinking themſelves more learned, lay aſide the Notions of their Forefathers, and attribute the Cauſe of Digeſtion to an acid Menſtruum in the Stomach, which is capable of diſſolving our Aliments, and converting them into Chyle: But thoſe Writers were always forced to take Refuge under the Shadow of a Structure, which, with the leaſt Gale of Wind, is in Danger of falling down upon their Heads; as thoſe Men themſelves, and not only they but the greateſt Chemiſts, are obliged to confeſs that they never could extract any Acid from the Blood, or any other animal Subſtance. But yet they will aſſert that Acidities are always found in the Stomach and firſt Paſſages; but we are obliged to ſay that this Aſſertion is not true, as we have made ſome hundreds of Experiments upon the Humours of the firſt Paſſages, and never yet could find any that will cauſe an Ebullition, Fermentation, or Conflict, with Alkalies; and we are well aſſured that when we eat acid Aliments or drink acid Liquors, after they have been in the Body long enongh to be ſaturated with the Juices of the firſt Paſſages they are no more acid: And what is commonly called an Acidity of the Primæ Viæ, proceeds from an alkaleſcent or rancid Acrimony of the Juices, and may be relieved by Acids.

Therefore, to avoid falling into the like Error with thoſe we have already mentioned, we ſhall obſerve that all Bodies univerſally contain within themſelves the natural Principles of Diſſolution, (as we have proved in Chap. I. Prop. XV.) and that the Particles of Fire and Air which enter into the Conſtitution of all material Subſtances, will, when excited and put in Motion, exert their centrifugal Force ſo as to diſſolve and diſunite all Bodies into the moſt minute Particles of Matter.

Now to produce this wonderful Effect, *i. e.* to excite and put into Action the Particles of Fire and Air which are retained in the natural Texture and Conſtitution of all mixed Bodies, and thereby to diſſolve and diſunite their cohering Particles, each Particle from its contiguous Particle, there is nothing elſe required than a ſufficient Degree of Heat, and a ſmall Degree of Motion, to excite to Action theſe expanſive Elements, or the centrifugal Force of all Particles of Matter: And to anſwer this Intention the Stomach is ſufficient, without any Acid or diſſolving Menſtruum

whatever;

whatever; for the Stomach is to be conſidered,

Firſt, As a warm, moiſt, and cloſe Veſſel, into which the heterogeneous Maſs of all our Aliments is received and retained.

Secondly, as an Organ, into which is ſecreted a large Quantity of ſerous Humours, for diluting, and blunting the ſharp Points of, the Aliments.

Thirdly, as it acts upon the Aliments, not only by its warmth, but by the Contraction of its muſcular Coat, and by an external Force which it receives from the Preſſure of the Diaphragm, and abdominal Muſcles. And from the Concurrence of all theſe different Cauſes are the Particles of Fire and Air contained in all Bodies, taken into this Organ as Aliment, excited to Action.

THEREFORE, to apply this to the Buſineſs of Digeſtion, it may be obſerved, that all the ſolid and fluid Aliments thus ſwallowed, having been firſt broken and divided by Maſtication, diluted with the Saliva, and mixed with the Air, are now received into this cloſe and warm Organ, where they begin immediately to ferment, or have an inteſtine Motion, occaſioned by the Particles of Air contained in, and ſwallowed with, the Aliments, being greatly rarefied by the Heat of the Stomach; and we have plainly proved before in Chap. I. Prop. XIV. that Air, when rarefied by Heat or Fire, has a very great expanſive Force, and, by the Force of the Air, Fire is excited to Action, and theſe, acting in Conjunction, are capable by their great centrifugal Force to diſſolve and ſeparate the moſt ſtrongly cohering Particles of mixed Bodies, ſo as to conſtitute a general fluid Maſs of Matter, without any Diſtinction or different Coheſion of Parts. But as there is in all Bodies an attractive coheſive Force, by which all Particles of Matter are kept in cloſe Contact with each other, it will plainly appear, as in the Caſe before us, that when the Particles of Matter are acted upon by theſe two Forces, which are directly oppoſite to each other, and when the centrifugal Force, occaſioned by the Rarefaction of the Air and Action of the Fire, begins to prevail, there muſt neceſſarily enſue an inteſtine Motion, Colliſion, and mutual Struggle among the Particles themſelves, whereby they recede and accede from and to each other, in Proportion to the Strength of theſe two Powers. But, as the expanſive Force of the Elements increaſes, the Parts of the Aliments muſt be diſſolved, and diffuſed ſo as to conſtitute a fluid Maſs: which Maſs, being mixed with the Juices of this Organ, will be reduced to a Subſtance not much unlike a thin frothy Jelly: And this is the firſt Scene of Digeſtion, which may be called rarefactive Diſſolution.

The Aliments being thus far digeſted in the Stomach, are thruſt forward through the Pylorus, by the Contraction of the Muſcles of this Organ, and emptied into the Duodenum or firſt Gut, where they are mixed with the Bile and pancreatic Juice, and undergo a ſecond State of Digeſtion, which we ſhall explain, after having made ſome Remarks upon what we have ſaid of this.

What we have here aſſerted plainly demonſtrates, that Bodies, whoſe Particles of Matter have the ſtrongeſt attractive coheſive Force, are the hardeſt to be diſſolved and digeſted by this Organ; thus Oils, and all oily Aliments, being endued with a very ſtrong coheſive Force, will be found hard of Digeſtion, and grow rancid, when taken in any Quantity upon a weak Stomach. This Rancidity ariſes from the inteſtine Motion or Fermentation of the oily Subſtance, cauſed by the expanſive Force of the Air and Fire contained therein; but, as the coheſive Force of this Kind of Aliment is very great, it will be ſome Time before the centrifugal Force gets the Predominancy, and the Body be diſſolved: And during this there muſt be a Fermentation and inteſtine Motion of the Particles of the Aliment, for the Reaſon we have juſt now aſſigned; and from which there very often aſcends ardent and bitter Eructations, and an inflammable Matter regurgitates into the Mouth, which ſome take

Bile, and others for Acidity, &c. but that it is neither Bile, nor an Acid, may be plainly proved from its flaming like Oil when thrown on the Fire, whereas either Bile or an Acid, being caſt on the Fire, will extinguiſh it.

There is another Phænomenon very commonly obſervable, which we are now to explain, otherwiſe ſome may object to what we have ſaid, as this at firſt Sight ſeems contradictory thereto. That is, when a gluttonous Perſon comes home from a Feaſt where he has crammed his Stomach with a Variety of Meats and Drinks, he finds himſelf ſleepy and inclined to reſt, goes to bed and ſleeps; next morning when he wakes he finds himſelf very uneaſy, with a great Load at his Stomach, and at laſt urges to caſt, and after ſome Reaching and Uneaſineſs brings up his Crapula of the preceding Day, whole and undiſſolved, and afterwards finds himſelf eaſy. Now from this ſome may be ready to object to what we have ſaid: for, ſay they, if the expanſive Force of the Fire and Air, which are contained in, and enters with, the Aliments, when ſet in Action by the Heat and muſcular Force of the Stomach, is the Cauſe of Digeſtion, or the Diſſolution of the Aliments, why ſhould not this have the ſame Force upon them at all Times. To this we anſwer, that it has the ſame Force at all Times, when the Heat of the Stomach and the Strength of its muſcular Fibres are the ſame; but in the Caſe now before us, the ſuper-abundant Quantity of Aliments lies ſo heavy upon the Coats of the Stomach as to render them Paralytic, and conſequently incapable of Motion; whereby its Heat muſt be decreaſed becauſe of a Stagnation of its Juices, for want of Motion, and the Contractions of its Muſcles greatly abated: and, 'till the ſuper-abundant Load is removed, there can be no regular Digeſtion or Diſſolution of the Aliments.

We obſerved before, that after the Aliments are forced out of the Stomach through the Pylorus, they meet with the Bile and Pancreatic Juice, in the Duodenum or firſt Gut. Now the proper Uſe of the Bile and Pancreatic Juice are to dilute and diſſolve the diſſolved Aliments yet more, to ſeparate their fine Particles from their more groſs, precipitating the more groſs Particles as Fæces, and preparing the more fine like a thin, white Liquor, reſembling Milk, which is commonly called Chyle.

THIS Liquor being thus purged and depurated of its more groſs Particles, is received into very minute Pipes or Strainers, which are ranged all along the Sides of the Duodenum, or firſt Gut, and Jejunum, or ſecond Gut, by the corpuſcular Attractions of thoſe minute Veſſels, commonly called Lacteals, where it undergoes a farther Degree of Attenuation and Dilution, by the great Quantity of lymphatic Juice which joins it, from the great number of lymphatic Ducts which empty themſelves in the chyliferous Veſſels; and with this lymphatic Juice the Chyle paſſes into the Blood by the left Subclavian Vein.

BESIDES this Action of the Bile in purifying the Chyle, it performs another and very eſſential Office in the Body; for, after the more fine Particles of the Ailments are ſeparated, and the more groſs precipitated,

the

the Bile greatly helps forward the Operation of that great Outlet by which all the groſs Particles of the Aliments are to be evacuated; as by its diſſolving and ſtimulating Qualities, it keeps theſe groſs Particles from running into too hard and dry Concretions; and likewiſe gently ſtimulates the Coats of the Inteſtines, and promotes their muſcular, vermicular, or periſtaltic Motion, ſo as to help forward theſe groſs Subſtances by Stool.

Thus is the Scene of Digeſtion, or Diſſolution of the Aliments, carried on in the firſt Paſſages; and while the primary great concoctive Gland performs its Function, and the Blood is ſupplied with a proper Quantity of well digeſted Chyle, all the animal Powers will be ſtrong and vigorous, and the Body remain in a State of Health. But as theſe concoctive Powers of the firſt Paſſages are ſubject to a great many Irregularities, it will be neceſſary for us to point out theſe Irregularities and their Cauſe.

We have already obſerved, that the firſt State of Digeſtion or Alteration of the Aliments, is performed by the centrifugal Force of the rarefied Air, and Particles of Fire, contained in, and ſwallowed with, the Aliments, excited by the Heat and muſcular Contraction of the Stomach. Now, if the Heat and muſcular Contraction of the Stomach are too great, their Action upon the expanſive Elements will be too intenſe and ſtrong, and he Effects will be a hot and flatulent Digeſtion, *i. e.* when the centrifugal Force of the Elements, or their diſſolving Power is too ſtrong, all the attractive coheſive Force of the Particles of Matter, with which the Aliments are compoſed, will be deſtroyed; and conſequently, inſtead of retaining their natural and due Conſiſtence, will run into a frothy, hot, and windy Flatus; and this hot, flatulent Subſtance, not being capable to be ſufficiently purged and depurated, after it has paſſed into the Inteſtines, by the Bile and pancreatic Juice, and afterward in the chyliferous Veſſels by the Lymph, muſt always ſupply the Blood with a great Quantity of hot and rarefied Particles; and therefore muſt be attended with all the Effects of a hot, flatulent, and acrimonious Fluid; as a great Heat and Tenſion of the *primæ viæ* during the Time of Digeſtion, great Reſtleſſneſs at Night, eſpecially after a late and Meat Supper; periodical Heats, a great Diſpoſition to ſweat, and Aptneſs to be overheated upon any Exerciſe or Motion more than common; and various other Symptoms too tedious to mention.

This Irregularity of Digeſtion or Diſſolution, generally attends thoſe Perſons who drink large Quantities of ſpirituous or vinous Liquors, and make Uſe of a great Quantity of high ſeaſoned Food, Sauces, Pickles, *&c.* and uſe but very little Exerciſe; and how ſtrong this Cuſtom does prevail among the Beau-monde in theſe Days of ours, I need not mention, becauſe every Body is a Judge. I ſhall only obſerve, that if a Perſon would endeavour to renounce this pernicious Cuſtom, and purſue the ſerene and manly Pleaſures of Temperance, Frugality, and Exerciſe, he muſt renounce almoſt all human Society. But it were much to be wiſhed, that this Species of Epicures, this Species of Drones, this Generation would ſoon bring the World to an End, by deſtroying, and rendering themſelves uncapable of propagating their Species; and in ſhort, that this Generation who are uſeleſs to themſelves and others, would renounce theſe their momentary Pleaſures, which are interſperſed with Pain and Anguiſh, and purſue the true and ſerene Pleaſures and Happineſs of this Life, which ariſe from Temperance and Exerciſe.

BUT when there is a Defect of the natural Heat and muſcular Contraction of the Stomach, and their Action upon the expanſive or centrifugal Force of the Elements is too weak and low, the attractive coheſive Force of the Particles of Matter which compoſe our Aliments will be too great: from whence muſt enſue a cold and hard Digeſtion, as the Action of the Stomach upon the expanſive Elements is not more than is ſufficient to diſſolve the more thin and watry Parts of the Aliments, thoſe Particles, whoſe attractive coheſive Force, with each other is very ſmall, while the richer Oils, and volatile Salts, contained in the Aliments, or thoſe Particles whoſe Points of Contact, and conſequently attractive Force, with each other, are very great, are left untouched, for Want of a proper Degree of Heat to rarefy their contained Air, and excite their fiery Particles to Action. And theſe volatile Salts and oily Particles, which, in a good Digeſtion, are the laſt that are acted upon and diſſolved, becauſe of their great attractive Force, are in this Caſe not ſeparated at all, becauſe the Action of the Stomach, upon the elementary Particles, is not ſufficient to render the expanſive or centrifugal Force ſuperior to the attractive or centripetal Force of the Particles, but are precipitated with the Fæces down the Guts, and evacuated by Stool. Therefore, of Courſe, the Blood can have nothing for its Nouriſhment, but the thin watery Particles of the Aliments, with a few Salts; and as theſe volatile Salts and oily Particles, which ſhould be conveyed into the Blood, and be attracted by its Globules, to keep up their Warmth and Elaſticity, being left undiſſolved by the digeſtive Powers, and evacuated with the Fæces, the globulous Part of the Blood, for Want of this refreſhing Supply to keep up its Warmth and Elaſticity, diſſolves gradually into Serum, and loſes its proper Quantity of Craſſamentum; whereby the Circulation becomes languid, the natural Heat of the Body decreaſes, the Fibres loſe their Elaſticity and Contractions, and grow ſoft and flabby, and all the animal Powers will gradually decay and languiſh: And as the globulous Part of the Blood is deprived of its Heat and Elaſticity, and conſequently runs into

Serum, the Liver will receive a Fluid which abounds too much with ſerous Particles, to ſeparate a good and laudable Bile; but what it ſeparates will be near of the Nature of common Serum, and conſequently will be incapable of performing its Office in the Inteſtines, *i. e.* of purifying the Chyle, and promoting the periſtaltic Motion of the Inteſtines, by its warming Stimulus or natural cathartic Quality; from whence muſt enſue an obſtinate Conſtipation and Obſtruction of the Bowels, with a continual Nauſea, Loſs of Appetite, and Inclination to vomit at every Thing.

THIS Irregularity of Digeſtion is for the moſt Part the Conſequence of the former, or its ſecond State. For when the Heat and Acrimony of the Blood have been much increaſed, and conſequently the Fibres of the Body too ſtrongly ſtimulated, and immoderately ſtretched, by too great a Quantity of hot and acrid Fluids, being forced on them by the increaſed Force of the Circulation, they cannot long continue in this State of Tenſion, but muſt at laſt ſink into this oppoſite State; as the attractive Force of the Particles of Matter with which they are compoſed is now almoſt deſtroyed.

COROLLARY.

When the miſerable Patient arrives to this State by his Intemperance and Luxury, his Cauſe is extremely dangerous, and he has only one Chance for his Life at the beſt, very often none at all: but what Relief may now be expected, muſt be from gently Emetics, and they frequently repeated, joined with a medicated opening

Wine, made of the beſt Rhurbarb and Cortex Peruvianus; and gentle Exerciſe: And, during the Uſe of theſe, to uſe a ſtrict Regimen of Milk, Vegetables, and white Meats, carefully avoiding all Debauches, and gradually decreaſing his uſual Quantity of Wine and Spirituous Liquors, till he can entirely omit them all.

CHAP. III.

Of the State of the Solids generally cauſing Fevers.

PROP. I.

To explain the Nature and Cauſe of a too great Rigidity and Elaſticity of the animal Fibres, and the different Kinds of Fevers which are produced thereby.

THE moſt ſimple animal Fibre conſiſts of very ſmall Parts, adjoining to each other length-ways: Theſe minute Parts or Particles are held together by their attractive coheſive Force; and the attractive coheſive Force of all Bodies, is greater or leſs in

Proportion to the Quantity of their Points of Contact; therefore in Proportion to the Quantity of Points of Contact in the Particles which compoſe the Fibre, will the coheſive Force or Strength of the Fibre be. If theſe minute Particles which conſtitute by their Union an animal Fibre, be conſidered as Particles, we know nothing of them, becauſe we cannot trace Matter back to its Origin: And thoſe who have made Attempts to diſcover the Nature of theſe Particles, and the Diſeaſes they are liable to, have been always groveling in a State of Obſcurity, and knew no more of it when they left of, than when they began.

That theſe Particles are endued with an attractive coheſive Force we all know, and that they may break off from one another, and loſe, in a great Meaſure, their coheſive Force, is what we may eaſily conceive; but as Matter continues to have the ſame Laws from the Beginning of the World to this Day, it appears highly probable that the minute Particles of all Bodies are unchangeable. Therefore the moſt ſimple Diſeaſes of the Fibres are not to be deemed a Default of the Particles with which the Fibres are compoſed, but from their different Coheſion, or the uniting of theſe together; ſo that too great or too little a Degree of Coheſion of the Particles of Matter which compoſe the Fibres, may cauſe too great a Rigidity, or Relaxation of the Veſſels, and Viſcera formed by them; and theſe may give Riſe to a great Number of Diſeaſes: Thoſe which proceed from too great a Degree of Coheſion, or Rigidity of the Fibres, we are now about to treat of.

OUR Life and Health do entirely depend upon the Fibres having a proper Degree of Tenſity, conſiſtent with a due Proportion of Flexibility, that every Veſſel which thoſe Fibres compoſe, may be ſo pliable as to be diſtended by the Blood which is forced into it by the Force of the Heart, and at the ſame Time to give a proper Reſiſtance to that Fluid, by their Springineſs and Elaſticity, to keep its Parts duly fluxile, and in a proper Degree of Motion. But when the Veſſels are too rigid and dry, there muſt immediately follow,

FIRST, A leſs Flexibility of them; conſequently they cannot be dilated ſo eaſily as in Time of Health.

Secondly, Their Diameters are decreaſed; as their Sides contract towards their Axis.

Thirdly, It follows of Courſe, that they will give too much Reſiſtance to the Fluids thrown upon them by the protruding Force of the Heart.

Fourthly, A leſs Quantity of Fluids will paſs through them, than in Time of Health: Conſequently the Dilatation of the Heart and Arteries will be decreaſed, and the Secretions leſſened.

Fifthly, The moſt thin and fine Parts of the Fluids, by this State of the Veſſels, are evacuated, and conſequently the remaining Maſs will be rendered more thick and viſcid: Whence proceeds too great a

Waſte of the nutritive Juices, which muſt end in a Fever, which will be perpetual, an Atrophy, or a compleat Maraſmus.

The Fibres of the Body may be known to be in this State, by the Fleſh of the Patient feeling very rough, hot, and dry; by the Smallneſs and Quickneſs of the Pulſe; by the Tongue being extremely dry, and, as it were parched; and by a very hot and quick Breathing: For when the Veſſels of the Lungs are too much contracted, and too rigid, they cannot dilate and contract as frequently as in the Time of Health, without great Pain and Uneaſineſs; conſequently the Circulation of the Blood thro' this Organ, and the Reception and Protruſion of the Air, on which Life depends, cannot be performed without ſome Difficulty.

COROLLARY.

THIS State of the Fibres may be reliev-ed by the Uſe of a thin watry Diet, very ſoft emollient Herbs, mealy Subſtances diluted and unfermented; by Reſt and long Sleep, eſpecially in a cool and moiſt Air; by watry Medicines externally applied, and theſe in a luke-warm State; by proper and frequent ſubtepid Bathing, more eſpecially if the Seaſon is cold and dry.—When Perſons of this Conſtitution fall into Fevers, they will always be of the inflammatory Kind, as acute continual Fevers, Pleuriſies, Peripneumonies, or the like: And in this Caſe I ſhould always adviſe a great Quantity of warm, emollient, diluting Liquors, to be continually taken by the Mouth, and caſt up by Clyſter, and at the ſame Time warm emollient Fomentations ſhould be applied to the Feet, Legs, Arms, Hands, and Hypochondria; as theſe will be found to have ſurprizing Effects in ſuch Caſes: By theſe the Blood will be effectually diluted and the Fibres relaxed, and likewiſe by the Vapour of theſe warm Liquids the Veſſels of the Lungs are relaxed, and conſequently the Blood muſt have a more free Paſſage through them; which will ſoon be followed with a copious and free Expectoration.

PROP. II.

To explain the Nature and Cauſe of a too great Weakneſs and Relaxation of the animal Fibres, and the different Kinds of Fevers produced thereby.

WE have obſerved, in our laſt Propoſition, that an animal Fibre conſiſts of very ſmall Particles of Matter, which adjoin to each other length-ways, by that attractive coheſive Force which is found to unite all Bodies together; and that in Proportion to the attractive coheſive Force of theſe minute Particles will the Strength or Weakneſs of the Fibre be. We have likewiſe, in our former Propoſition, pointed out that Degree of Coheſion of theſe Particles, or Strength of the Fibre, which is neceſſary to keep the Body in a healthful State, and likewiſe that Degree of Coheſion which brings on too great a Rigidity and Elaſticity of the Fibre, with the Effects produced by this Cauſe; and it now remains for us to reſolve this ſecond Propoſition, *i.e.* to explain the Nature and Cauſe of too great a Weakneſs and Relaxation of an animal Fibre. The Weakneſs of a Fibre proceeds from the Union of its Particles with too ſmall a Degree of Coheſion, or by ſo few Points of Contact, that they are capable of being diſunited by a Motion which does not much exceed that which is the Effect of Health; very often even that will diſunite them.

We have plainly ſhewn in our former Propoſitions, that the Veſſels of our Bodies, which are compoſed of theſe Fibres, ſhould always yield to the Force of the Circulation, and be diſtended by their contained Fluids; but then theſe Veſſels, by the Strength and coheſive Elaſticity of their Fibres, ſhould give a proper Reſiſtance and Degree of Motion to their contained Fluids, ſo as to keep their Parts duly fluxile, to perform the natural Functions of Life. Hence therefore the Fibres of the human Body are ſaid to be too weak, when they are rendered incapable, without doing Injury to their Coheſions, of ſuſtaining that Motion, which is requiſite for the Exerciſe of the Functions of the Body, in the Time of Health. If the Fibres had ſuch a Degree of Strength, and would ſuſtain that Motion which is requiſite in Health for the Exerciſe of the natural Functions, it would not be ſufficient to keep the Body in perfect Health; for the Fibres ſhould ſuſtain a much greater Force and Quantity of Motion, otherwiſe the Body cannot ſubſiſt. When the minute Particles, which conſtitute the Fibres, cohere with no greater Force, than what is requiſite to ſuſtain the Motions of the Fluids through the Veſſels when Nature is calm and ſerene; their coheſive Force will be immediately deſtroyed when the Velocity of the Fluids is increaſed; which muſt certainly be the Caſe very often, notwithſtanding our greateſt Precaution, and then Death muſt be the Effect.

It is a certain Fact, that theſe minute Particles of the Fibres conſiſt of the Things we are nouriſhed by; but then this is equally certain, that this Matter muſt undergo a proper Preparation by the animal Functions before it can be aſſimilated into our Nature, and reſtore what has been rubbed off from the Fibres, by the Motions of the Body. Therefore theſe Particles may loſe their attractive Force by the Nature of the Aliment with which they are formed, or by this Aliment not undergoing a proper Preparation in the Body, before it is applied to Nouriſhment.

THE Effects of too great a Weakneſs and Relaxation of the animal Fibres are,

FIRST, A very eaſy Extention of the Veſſels, compoſed of theſe weak Fibres; whence a Deficiency in the Strength or Force of the Action of the Heart, Lungs, and Arteries.

SECONDLY, Their Rupture, or ſluggiſh Motion on their contained Fluids; conſequently, Tumours muſt ariſe from the Preſſure of the Fluids; inteſtine Motion and Putrefaction, from their Stagnation or Extravaſation; a Viſcidity of the whole Maſs, for want of a proper Degree of Mo-

and Attenuation; and a diſuniting of the ſerous Part of the Blood from the globular: Nor is the Chyle ſufficiently aſſimilated into Blood.——Hence irregular Concretions in the Veſſels, a Lentor or Viſcidity in the Serum and Lymph, a ſmall Quantity of the nervous Fluid, and all the other Secretions weak and imperfect: And conſequently there muſt follow Cachexy, intermitting and remitting Fevers, which are very irregular, or thoſe Fevers commonly called Nervous: For when the Fluids of the Capillary Veſſels have not a proper Degree of Motion from their containing Veſſels, they immediately grow viſcid, and form Obſtructions in theſe Veſſels; and it is a well-known Axiom that all the Humours of the human Body, when they have not a proper Degree of Motion to keep their Parts duly fluxile, and maintain their Elaſticity, begin to have an inteſtine Motion, and corrupt, and ſoon after grow acrimonious; and very often to that Degree as to bring on Fevers of the worſt Kind, commonly called Malignant: For though the Circulation may be very languid from the Weakneſs of the Fibres, yet it is ſufficient to give the Fluids a Degree of Heat that will ſo rarefy their included Particles of Air and Fire, as to cauſe an inteſtine Motion within themſelves; whence muſt follow a feveriſh Heat from their ſtimulating Acrimony, and in the End a general Putrefaction.

THIS State of the Solids is relieved by a very nutritive Diet, which is very eaſy of Digeſtion; by gentle Exerciſe, as riding on Horſe-back or in any Kind of Vehicle, Walking, Sailing, and all Kinds of Exerciſe, which gently increaſe the Motion of the Solids and Fluids; by Friction; by a gentle Compreſſure of the Veſſels, and a moderate repelling of their contained Fluids; by ſuch Medicines as increaſe the Excretions by Urine, or inſenſible Perſpiration, thereby leſſening the Quantity of the Lymph and Serum in the Body; and by ſuch Medicines as brace the relaxed Fibres, *i.e.* ſuch as will bring the Particles which compoſe the Fibres to adhere by a greater Number of Points of Contact, and conſequently a ſtronger Coheſion: And theſe are ſuch as have in their Compoſition a great Number of Particles of elaſtic Air and Fire; for theſe, when received into the Body, do immediately cauſe a gentle Fermentation in all the Fluids, by the Elaſticity of their contained Particles, being excited to Action by the Warmth of the Body; whence muſt immediately follow an increaſed Degree of Warmth in the Body, by the Particles of the Fluids being ſtrongly agitated by the rarefied Air, and Particles of Fire contained in the Medicine: and conſequently a Rarefaction of the Blood-Globules, by which they abſorb a greater Quantity of its Serum than they uſed to do, and by ſo doing its Texture will be ſtrengthened, and the whole Maſs rendered incapable of entering into Veſſels undeſigned for its Reception, commonly called Error of Place; and thereby cannot obſtruct or lay a Load upon any of the elaſtic Veſſels of the Body; whence its Fibres muſt be gently contracted, by the agreeable Warmth and Stimulus given them by this Fluid in all Parts of the Body. Of this Claſs of Medicines may be reckoned all Aromatics, Chalybeats, and Acids.

CHAP. IV.

Of the general State of the Fluids cauſing Fevers.

PROP. I.

To explain the Nature and Cauſe of a too great Velocity of the animal Fluids and the Fevers cauſed thereby.

THE Fluids of the human Body ſhould always be kept in ſuch a Degree of Motion as is neceſſary to keep their Parts duly fluxile, ſo as to conſtitute one uniform Fluid. But if this Degree of Motion is increaſed, it muſt immediately diſorder the whole Maſs, and Diſeaſes muſt enſue; the Cauſe and Effects of which we are now going to treat of.

THE increaſed Velocity of the Blood, through its containing Veſſels, ariſes from the quicker and ſtronger Contractions of the Heart and Muſcles; and the quicker and ſtronger Contractions of the Heart and Muſcles ariſe from whatever increaſes the Quantity or Acrimony of the Blood; and likewiſe by whatever increaſes its Heat and Rarefaction. The Quantity of the Blood is increaſed by an Obſtruction of any of the natural Evacuations, when at the ſame Time the Blood is nouriſhed as before with a good and laudable Chyle; whence muſt ariſe a quicker and ſtronger Contraction of the Heart, as that Spring of vital Power has a greater Quantity of Fluids to protrude through the Arteries, and conſequently muſt increaſe its Contractions, or let the Blood be accumulated upon its Ventricles, and immediately ſink under the Burthen. The Contractions of the Heart being increaſed, the Velocity of the Blood through its containing Veſſels muſt likewiſe be increaſed, and conſequently its Heat; whence the Contractions of the Muſcles will be likewiſe increaſed; and by theſe being increaſed, the Blood-globules will become more denſe and in greater Quantity, the Veſſels more ſtrong and elaſtic, and conſequently their Action upon the Fluids will be much increaſed; whence of Courſe great Friction, and much Heat will be generated, which both diſſipates the more fine lymphatic Parts of the Blood, and increaſes its Velocity; whereby that

Fluid becomes much more glutinous, and of Courſe unfit to paſs the minute Branches of the capillary Arteries: And hence ariſe inflammatory Fevers of all Kinds.

THE Acrimony of the Blood may ariſe,

FIRST, From the foregoing Cauſes long continued; for by theſe the Blood will at laſt become acrid, by its violent Heat, which develops all its volatile Salts, and ſets them at Liberty to act on its other conſtituent Parts; whence muſt ariſe this Diſſolution and Acrimony.

SECONDLY, By mixing ſome acrid Matter with the Blood, whether of an aromatic, ſaline, ichoroſe, or alkaline Nature; for when the Body is in perfect Health, our Humours are mild, (as the Blood of a Perſon in Health being dropt into the Eye will give no Pain) and like to a fine Balſam, and the Circulation is then moſt ſerene and equable: But when any acrid Matter is mixed with this Fluid, it immediately begins to prey upon its globular Part, as being endued with the greateſt attractive coheſive Force, and conſequently attracts this Matter the moſt, firſt deſtroying the Elaſticity of theſe Globules; and ſecondly diſſolving their conſtituent Parts, and making them mix with the Serum.—— Hence muſt immediately ariſe great Confuſion in the Body; for the active and ſaline Particles of the Blood, being now diſunited from the reſt of the Maſs and ſet at Liberty, begin to ſtimulate the internal Coats of their containing Veſſels; and thereby increaſe their Action upon the Fluids, and conſequently their Velocity; and by their Velocity being increaſed, their Heat will likewiſe be increaſed, and a Fever raiſed; which will be of the putrid Kind, commonly called malignant; and will be greater or leſs in Proportion to the Strength of the Texture of the Maſs of Fluids. For when the globular Part or Craſſamentum of the Blood is entirely diſſolved, by this acrid Subſtance, (as is very often the Caſe) and this Fluid rendered a a dirty Puddle of acrid Matter, the Fever then cauſed will not be attended with as great a Degree of Heat as otherwiſe, but will for the moſt Part be attended with, either a Mortification of ſome principal Part, an Eruption of black or livid Spots, (which are, in ſhort, Mortifications) or very profuſe and dangerous Hæmorrhages. The diſſolved Craſſamentum then, forced by the Power of the Heart and Arteries into capillary Veſſels not deſigned for it's Reception, is the occaſion of thoſe livid

Spots on the Skin; but if the Force of the Heart and Arteries be ſtrong enough to break the containing Veſſels, an Hæmorrhage muſt enſue, greater or leſs, in Proportion to the Magnitude of ſuch Veſſels, and Quantity of Acrimony of the Fluids therein contained.

And thirdly, the Acrimony of the Blood may ariſe from a volatile Matter being mixed with it, of the contagious, peſtilential, or poiſonous kind. This contagious Matter, to us, appears to be nothing elſe than a volatile Effluvia, which paſſes off from the infected Body, and is compoſed of the moſt volatile ſaline and oily Particles of that Body, which, by the diſſolution of its Particles is developed, and ſet at Liberty, and compoſes a Kind of natural Sapo, or Solvent. This active volatile Matter, being attracted by the circumambient Atmoſphere, may be conveyed, with the Current of Air, to Places very diſtant from the infected Bodies, and then be drawn in with the Breath of Animals; and in the ſame Species of Animals which it ariſes from, it produces the ſame Diſſolution of their Fluids, as was that from whence it aroſe: It never diſorders an Animal of a different Species, becauſe the Texture of the Fluids of all Animals is different, and every Kind of Matter whatever is moſt eaſily attracted by that of its own Kind (this is a known Fact) therefore we may conclude that this volatile Sapo will always be attracted by thoſe Particles of Matter, which are of the ſame Nature and Texture of thoſe from whence it was developed, and by the expanſive Force of its contained Elements, forced into its ſphere of Repulſion, and conſequently its Particles very minutely divided. This volatile Matter, when received into the Body with the Air, is immediately attracted by that Part of the Fluid from which it was ſet at Liberty, *i. e.* the Blood-Globules; and immediately as being a natural Solvent, deſtroys their Elaſticity, and brings them to a State of Diſſolution, by the Fermentation it excites in their contained Subſtance; and very ſoon follows a Train of the ſame Kind of Symptoms which happened to the Body from whence this Matter aroſe; and thus is Contagion propagated, in every different Species of Animals.

SCHOLIUM.

THAT Contagion is propagated by the Means we have juſt now deſcribed, may be plainly proved from the following Obſervations.

I. When a Perſon, in ſound Health, happens to receive into his Body ſome of the volatile Effluvia which paſſes off from another Perſon ill of the Small-Pox, although, very often, he is at ſome Diſtance from the Perſon infected, immediately his Blood becomes rarefied, from the Fermentation which is cauſed in its Globules; and a gentle Fever will be raiſed; and as the Globules become more diſſolved, they cauſe an Acrimony of that Fluid, as we have proved before, whence a violent Fever; and as the volatile active Particles of that Fluid contained in the Globules, attract this contagious Matter with the greateſt attractive Force, it muſt be mixed and united with them, and theſe being the moſt fine and volatile Parts of this Fluid, and conſequently when developed and ſet at Liberty, are the moſt eaſy to be protruded to the Surface of the Body, where they are, by the Force of the Circulation, forced into the minute Veſſels, with ſuch a Velocity as greatly diſtends them, even to raiſe them above the Surface of the Skin, in the Form of Puſtules: And, immediately after, the Fever ceaſes, although it continues in a ſmall Degree for ſome Time. As this volatile Matter does not act upon all the Globules at once, there will conſequently be ſtill ſome Degree of Fever 'till the whole Maſs has been vitiated, and then the Fever entirely ceaſes, and the Small Pox is, as they term it, at the Height. Then the Circulation begins to grow more languid; and as the protruding Force of the Heart decreaſes, the Reſiſtance the Fluids give to the Contractions of the veſſels will likewiſe decreaſe, and of Courſe ſome of this protruded Matter will be, by the Contractions of the Veſſels, forced again into the Maſs of Fluids, whence a new Fever ariſes, commonly called a Secondary Fever, which continues 'till the Maſs of Fluids is cleared of this putrid Matter.

It has likewiſe been found by Obſervation, that every different Kind of Animals are liable to different contagious Diſeaſes, which very ſeldom, if ever, affect others.—The contagious Matter which is the Cauſe of the Plague, has very often been found to be ſtrongly attracted by Cotton, Wool, Linen, Silk, ſpungy or porous Wood; becauſe the Particles of which compoſe ſuch Bodies are very large in their Surfaces, in Proportion to their Denſities, and conſequently have a very great attractive Force. Here the contagious Matter becomes inactive, becauſe of the Body's coldneſs which cannot give it ſuch a Degree a Degree of Motion as is requiſite to deſtroy its conſtituent Particles; but when this is applied to the Body of a Man, it immediately loſes its Contact with the other Bodies, and flies to that, and particularly to the globulous Part of the Fluids, as this has the greateſt attractive Force of any Part of the human Body, where, by the Warmth and Motion of the Globules, this Matter is rendered active, and very ſoon deſtroys their Texture and Elaſticity, brings on a violent Fever, and quickly kills the Patient; except this Matter can, by violent active Medicines, be forced to the extreme Parts of the Body.

PROP. II.

To explain the Nature and Cauſe of a too languid Circulation of the animal Fluids, and the Fevers cauſed thereby.

A too languid Circulation of the animal Fluids may ariſe from,

1. A Relaxation of their containing Veſſels; whereby they cannot have a proper Degree of Motion.

2. From a Plethora, or too great a Quantity of good Blood; *i. e.* ſuch a Quantity as the Veſſels cannot render capable of undergoing thoſe Changes, which are neceſſary for animal Secretion, without cauſing Diſeaſes; conſequently the Veſſels will be loaded, their Action upon

the Fluids decreaſed, and a too languid Circulation cauſed thereby.

3. By the Fluids being nouriſhed with a cold, heavy, viſcid Food. For the Fluids contained within us are either crude, and retain in Part the Nature by which they are nouriſhed: or, by the Action of the digeſtive Powers, they have already acquired the Properties which belong to human Fluids. If therefore the Aliments by which our Fluids are nouriſhed, be ſuch as are commonly called hard of Digeſtion, or whoſe Particles of Matter ſtrongly adhere together, then the digeſtive Powers will not be able to break ſmall enough their Particles, to render them capable of entering into the minute Paſſages of the Body; conſequently the glandular Secretions will be decreaſed, and the Fluids rendered more groſs and denſe, where-

by their Velocity will be much decreaſed, and immediately Diſeaſes follow; the Nature of which we are now going to treat of.

And firſt, when the Action of the Veſſels upon their contained Fluids begins to decreaſe, the Digeſtions decreaſe likewiſe; the moſt rich Oils and volatile Salts contained in the Aliments remain undiſſolved, and the Blood is nouriſhed only with their moſt thin and watery Parts; hence the globular Part of that Fluid will be decreaſed, and likewiſe too looſely cohering; and its ſerous Part becomes too watery and vapid, and ſometimes grows viſcid. From this State of the Fluids all the Secretions become imperfect, and not ſufficiently participant of an animal Nature; the Bile becomes inert, and like the Serum of the Blood; the nervous

Fluid more groſs and viſcid; the Saliva a mere viſcid Mucus, and all the reſt of the glandular Secretions, in Proportion to theſe, inactive and viſcid. From whence ariſes a univerſal Indigeſtion, Paleneſs, Coldneſs, and Cacochymy; and in ſhort ſuch a languid Motion of the animal Fluids, that they at length, fall into inteſtine Motions and Acrimony, for want of a proper Degree of Motion. Whence ariſes ſuch a Degree of Acrimony as to end frequently in Fevers of that Kind which are commonly called Nervous.——But if the Corruption and Acrimony of the Fluids are very great, this State frequently ends in that Fever which is commonly called the miliary Fever and is very often attended with dange- Conſequences.

Secondly, when there is too great a Quantity of good Blood produced in the Body, the Veſſels will be diſtended or loaded whereby their Action upon their contained Fluids, will be greatly decreaſed. Too great a Quantity of good Blood is commonly called a Plethora, and conſequently, if the Body is not otherwiſe diſordered, cannot be called a Diſeaſe: And when we ſay a Man is plethoric, we do not underſtand by that, the Exiſtence of any Diſeaſe, but that he is ſo full of Fluids, that if their Quantity be farther increaſed by any accidental Cauſe, or theſe Humours rarefied by any Cauſe, except there are immediate Evacuations, their Reſiſtance againſt their containing Veſſels will be ſo great, as to endanger a Rupture, or diſtend them ſo far as to weaken their Springs, and Action upon their Fluids; and the Fluids, when the Action of the Solids upon them is abated, immediately decreaſe their Motion, fall into inteſtine Motions, and grow acrid, whence ariſe Fevers, to which Phyſicians give the Name of Compound Inflammatory. Thus, a Perſon who is plethoric may enjoy a good State of Health, and be free from the leaſt Ail, but then this Perſon is always in Danger of being attacked with a violent Diſeaſe; for by the Increaſe of Heat in the Atmoſphere, by the leaſt Irregularity in the Non-naturals, by indulging any violent Paſſion, or, in ſhort, any thing which encreaſes the Velocity or Rarefaction of his Fluids, he is immediately thrown into a raging Fever; and it is almoſt impoſſible to guard againſt, or prevent ſuch unforeſeen Accidents, from happening to the moſt healthy, except it be by evacuating the ſuperabundant Quantity of Blood. ---A Plethora is cauſed by whatever produces a large Quantity of good Chyle and Blood, and at the ſame Time leſſens the Quantity to be ſecerned by the Glands.

Thirdly, The Blood being rendered more languid by the Viſcidity and Denſity of the Aliments, there is immediately produced in the Primæ viæ, a Senſe of Fulneſs, Loſs of Appetite, Indigeſtion, Coſtiveneſs and a ſwelled Belly: In the larger Veſſels this Fluid contracts a Viſcidity and Lentor, and is thereby rendered incapable of paſſing through the minute Veſſels of the Body, through which it ought to paſs; and in theſe minute Veſſels it produces Obſtructions, Concretions, and at laſt deſtroys the Action of all their Glands, and gives Riſe to a White Swelling. The Urine is now pale and thin, and all the Secretions greatly retarded, eſpecially thoſe which ſecrete the moſt ſubtile Liquids; whence all the Concoctions, Secretions, and Excretions of the Fluids are diſordered; the

Fluids fall into inteſtine Motions for want of a proper Degree of Motion, and the Tendency to a ſpontaneous Corruption is univerſal; the Perſon has now very fœtid Belchings, and gnawing at the Stomach; the Pulſe is now very irregular, and the vital Motions are entirely diſordered; as appears by the great Difficulty of breathing upon the leaſt Motion; the great Anxiety, Palpitations of the Heart, and Swooning, and that upon the ſlighteſt Occaſion; the depreſſed Pulſe, whilſt the Patient remains quiet and inactive; and the irregular and intermitting one, upon the leaſt Degree of Motion. The Humours now begin to grow acrid, and the Patient has a præternatural longing for extravagant Things, chiefly thoſe of the abſorbing Kind, as Chalk, Earth, Aſhes, *&c.* which Girls in this Diſeaſe do very often ſwallow down in private, and from whence ariſe moſt miſerable Diſeaſes: And when the Humours begin to grow putrid, a fever is generated, which for the moſt Part ſends the Patient into the other World.

CHAP.

CHAP. V.

Of a ſimple continued inflammatory Fever.

PROP. I.

To explain the Nature and Cauſe of a Simple continued Fever, and the Effects produced upon the Body thereby.

A SIMPLE continued inflammatory Fever, is a Fever of two, three, or four Days Continuance, or ſome times longer; and ſeldom attended with any dangerous Conſequences, except neglected, or ill treated; is occaſioned by whatever increaſes the Action of the Solids upon the Fluids, and the Re-action of the latter on the former; as obſtructed Perſpiration, or the leſſening of the Quantity of any of the other Evacuations; by which the Equilibrium between the Force of the contractile Solids and the circulating Fluids will be broke; as by the Fluids being increaſed in Quantity, the Heart will be obliged to redouble its Contractions, to protrude the increaſed Quantity of Fluids thro' the Arteries, and by the Contractions of the Heart being increaſed, the Velocity of the Blood through the Arteries will likewiſe be increaſed; and conſequently, by its Attrition againſt the Sides of the Veſſels, a greater Degree of Warmth will be generated in that Fluid; whereby its aerial Particles will be rarefied, and its Globules diſtended, and rendered incapable of paſſing freely the ſmall Veſſels they uſed to paſs through; whence ariſe Obſtructions of thoſe minute Veſſels, and thereby an increaſed Quantity of Fluids in the larger Veſſels; which being driven on with a violent Impetuoſity through their Tubes, and having an increaſed Degree of Heat, (the Conſequence of this impetuous Motion,) by both theſe, the Fibres will be ſtrongly irritated, their Motions or Contractions increaſed, and this Fever generated. Its Effects are, firſt, a Senſe of Cold, Shivering and Trembling; which are ſoon ſucceeded by Heats, Pain in the Head, or other Parts of the Body, and a ſtrong quick Pulſe; theſe are ſoon ſucceeded by a great internal Heat, which diffuſes itſelf into the extreme Parts of the Body; a great Thirſt, Difficulty of Breathing, and Reſtleſſneſs: a Loſs of Appetite, and a gea general Nauſea and Reluctancy of the Stomach againſt every thing but thin diluting Liquors.

PROP. II.

To explain the Method of allaying thoſe Symptoms, and entirely eradicate the Diſeaſe.

By conſidering the proximate Cauſe of this Diſeaſe, the Method of Cure for it is very obvious, which is by leſſening the Velocity, Quantity, and Acrimony, of the Fluids, and thereby the increaſed Contractions of the Solids will decreaſe; all which are known to be the Cauſe of this Diſeaſe. And to anſwer this, no Method, which has yet been diſcovered, exceeds the following.

BLEEDING is to be immediately uſed, as nothing ſo ſoon abates the too great Velocity, Quantity, and Heat of the Blood as Bleeding. This ſhould be done on the firſt Days of the Diſeaſe, becauſe the longer Evacuations, of which this is the principal, are neglected, the more viſcid and acrimonious will the Blood be rendered, by diſſipating its more thin Particles, condenſing the globular Part, and rendering the ſerous Part much more viſcid; and by continually exalting the animal Salts and Oils to a greater and greater Degree of Acrimony. The Quantity of Blood to be taken away muſt be in Proportion to the Strength of the Patient, and Violence of the Symptoms; and, if there be Occaſion, it may be repeated.

There are ſome particular Symptoms which we cannot forbear obſerving here, as we have been deceived by them ſeveral Times, and inſert them as a Caution for others; which are an Oppreſſion of the Pulſe, with Coldneſs, and Faintneſs; which very often attend this and other inflammatory Fevers, in the Beginning; and are occaſioned by the ſuper-abundant Quantity of Blood in the Veſſels, which loads them, and renders the Fibres inactive; we have often found this the Caſe, and, notwithſtanding the Faintneſs and Oppreſſion of the Pulſe, have immediately ordered a large Quantity of Blood to be taken away; and afterward the vibration of the Artery became more ſtrong and free, the Faintneſs immediately vaniſhed, and a great Heat began to diffuſe itſelf all over the Body, which before was cold. Very ſoon after bleeding, if the Patient is ſick at Stomach, or has any Reachings, he ſhould have a gentle Vomit of Vinum Ipecacoanhæ, or the like, to cleanſe his Stomach, and ſhould drink plentifully of thin diluting Liquors. But if he finds no Uneaſineſs at his Stomach, immediately caſt up a Lenient Clyſter, to empty the Bowels of their Contents, which may be repeated once every two Days. The Day after Bleeding, if the Symptoms are not greatly abated, he may take the following Medicine in proportion to his Strength and Age: The following Recipe is calculated for a ſtrong Adult.

℞ *Sperm. Ceti (in q. s. Vitel. ov. ſolut.)* ʒſs; *Sal. Nitri* ℈j; *Aq. Alex. Simpl.* ℥iſs; *Tinct. Caſt. Ruſ. g.t* xi; *Syr. Balſ.* ʒiij. *M. f. hauſt. omni Trihorio ſumend. Superbibend. hauſt. Theæ Meliſſæ.*

By this Method a natural and regular Criſis may in due Time be expected, which may be known by ſome or all of the following Appearances.

1. A sensible Abatement of the Heat and Thirſt, with a beginning Moiſtneſs and Lubrication of the Salival Glands.

2. A muddy Urine, with a Sediment or Separation of its Parts upon ſtanding.

3. An eaſy, cooling Diaphoreſis, or Sweat which will very often be viſcid and fœtid.

4. Black, viſcid, tenacious, or otherwiſe diſcoloured ſtinking Stools.

5. The Pulſe during theſe Diſcharges becomes very regular and natural.

AND as ſoon as the Criſis or Solution of the Fever manifeſtly appears by theſe Symptoms, we ſhould immediately order the Patient ſome cooling Cathartic, to cleanſe the Bowels, and carry off any of the hot acrid Matter which may have been thrown thereon, for which I would recommend ſuch as the following.

℞ *Mannæ opt.* ℥j; *Juſcul. Avenac.* ℥ij; *M. f. Solutio. Cui adde Pul. Rhab. Sal. Diuretic aa* ʒſs; *M. f. hauſt. Cathart. Mane cum Regimine ſumend.*

CHAP.

CHAP. VI.

Of an acute continual inflammatory Fever.

PROP. I.

To define the Nature and Cauſe of an acute continued Fever.

IN our foregoing Chapter we have defined the Nature and Cauſe of a ſimple continued inflammatory Fever, and now we are about to define the Nature and Cauſe of an acute continued Fever, which is of the ſame Nature with the former, only the Heat, Velocity, Acrimony, and inflammatory State of the Blood are much greater; its fine balſamic Particles more diſſipated; its red Globules more condenſed; its ſerous Part heated to ſuch a Degree as to turn it into a kind of Jelly; and its Salts and Oils exalted to a very great Degree of Acrimony: And when the Fever continues any Time, the whole Maſs grows acrid and unfit for animal Uſes. Beſides this, there are very often Obſtructions in the ſmall capillary Arteries and lymphatic Veſſels, formed by the denſe Globules being forced into thoſe Veſſels, undeſigned for their Reception, commonly called *Errore Loci*, whence Inflammations and Ruptures of the Veſſels frequently follow. The Antecedents of this Fever are,

1. An extreme cold Air; by which Perſpiration is obſtructed, the Fibres too ſtrongly braced, and the Fluids congealed in the capillary Veſſels, lying in the

external Parts of the Body, which increaſes gradually to the larger Veſſels: Whence ariſes this Fever, from a Plethora, and Lentor of the Fluids in the capillary Veſſels.

2. A VERY hot Air; by which the Particles of Air contained in the Blood are rarefied, and conſequently its Globules diſtended, and its fiery Particles excited to Action; and thereby the Craſſamentum and ſerous Parts of the Blood will be brought to a Union and Coheſion with each other; and, conſequently, when the Craſſamentum and ſerous Parts of the Blood are brought to coaleſce, the Courſe of the Serum thro' the ſerous Veſſels, and the courſe of the red Blood thro' the ſanguine capillary Arteries will be difficult and ſlow, and the Motion of this Fluid through the larger Arteries, thereby much augmented, the

Friction of its Globules againſt the Sides of the Veſſels, and conſequently its Heat and Rarefaction much increaſed: by which, except there is immediate Relief, the Texture of the Globules is quite deſtroyed, by the expanſive Force of their contained Air; its Salts and Oils are exalted to a very great Degree of Acrimony, and at length the whole Maſs is rendered an acrid Puddle of corrupt Matter.

3. DRINKING too great a Quantity of ſpirituous or vinous Liquors, or uſing too great a Quantity of acrid Sauces; by theſe the Fibres of the Body will be greatly ſtimulated, and of Courſe their Action upon the contained Fluids greatly increaſed, by which their Velocity, Friction, and Heat, will be much augmented, and their contained Particles of Air greatly rarefied; whereby a Fever will be raiſed, as we have obſerved before.

4. IMMODERATE and violent Exerciſe. For notwithſtanding gentle Exerciſe is ſo beneficial to the Body, for promoting the glandular Secretions, and giving a proper Degree of Motion to the Fluids; yet when the Action of the Solids upon their contained Fluids is raiſed to its higheſt Pitch, by violent Exerciſe, and continued in this State for ſome Time, the Motion of the Fluids will be increaſed to that Degree, as to raiſe a Fever, by the great Friction there is between the Solids and Fluids rarefying the aerial Particles of the latter: Which violent Motion of the Fluids will ſometimes rupture their containing Veſſels: From this Rarefaction a great Quantity of the ſerous Parts of the Blood will be attracted by and united with the globulous part and conſequently the Maſs made to poſſeſs a larger Space than uſual, and likewiſe ren-

dered more thick and viſcous; and if this violent Motion of the Fluids is continued, it at laſt ſo volatilizes the Salts and Oils of the Blood as to entirely diſſolve the whole Maſs, and render it putrid. We ſhould likewiſe obſerve, that when Perſons are heated to this Degree by violent Exerciſe, they are very deſirous of cooling themſelves; and to anſwer which, they injudiciouſly drink large Quantities of cold Liquors, or expoſe their Bodies to the cold Air, by putting off their Clothes, &c. whereby the perſpiratory Glands will be obſtructed, and the Fluids congealed in the minute Veſſels upon the Surface of the Body; which, joined to the fore-mentioned Cauſes, do produce a Fever of the moſt acute Nature.

5. A SUPPRESSION of any of the natural Evacuations; for by theſe the Quantity of

the Blood is increaſed, and the Fever raiſed by a Plethora, as we have obſerved before.

6. Too much Watching; for by this, and likewiſe ſitting up at Nights, is the Quantity of the expurgatory Secretions much increaſed, and the Fibres rendered too ſtiff and rigid; whereby the Blood will not only be robbed of its fine balſamic Parts, ſecreted by the lymphatic Glands, and afterwards united with it again, but its Velocity will be increaſed, by the Action of the Fibres being increaſed, whereby the Maſs will ſoon be rendered very acrid, and a Fever be raiſed.

7. HUNGER and Thirſt; for the Office of the Chyle ſeparated from the Aliments is to cool and dilute the Blood, as well as to afford Nouriſhment to the ſeveral Organs of the Body. Therefore if the Blood

is robbed of this cooling and diluting Liquor, it muſt ſoon grow denſe, acrid, hot, and alkaline; and conſequently be rendered incapable of ſupplying the ſeveral Functions of Life; whence muſt be raiſed, very ſoon, a Fever, from a Heat and Acrimony of the Fluids; which, if not immediately relieved, muſt render them putrid, and end in Death.

FROM what has been ſaid we may deduce the following Corollaries, to prove the immediate Cauſe of this Diſeaſe.

COROLLARY I.

THAT an increaſed Quantity of the Blood alone, may increaſe its Velocity; its increaſed Velocity increaſe its Friction, Heat, and conſequently a Rarefaction of its aerial Particles; that theſe, in Conjunction, may increaſe the Vibrations of the

Fibres, diſtend the Blood Globules, and thereby render them capable of attracting and retaining a greater Quantity of Serum than they uſed to do.

COROLLARY II.

THAT by theſe the whole Maſs will be rendered more viſcid, and incapable of paſſing the minute Veſſels, or ultimate Branches of the ſanguine and lymphatic Arteries, and thereby will Obſtructions be formed; that by theſe Obſtructions will the Quantity of Fluids be more increaſed in the larger Veſſels, and conſequently the Heart be obliged to increaſe yet more its Contractions; and all the foregoing Cauſes be increaſed.

COROLLARY III.

THAT by theſe Cauſes will the Salts and Oils of the Blood be ſo far exalted as to greatly increaſe the Acrimony of this Fluid, and at laſt the entire Diſſolution of its Globules, its Putrefaction, and the Death of the Animal.

COROLLARY IV.

THAT when the Fluids are rendered hot and acrid, by their being robbed of their Supply of cooling balſamic Liquids, their Diſſolution, and the Death of the Animal, will much ſooner be performed, than when they grow acrid and diſſolve by the forementioned Cauſes.

PROP. II.

To deſcribe the Effects of an acute continual Fever upon an animal Body, or the Riſe of the moſt uſual Symptoms incident to the Diſeaſe.

1. THIS Fever is uſhered in with a Coldneſs, Chillneſs, and Trembling; the Pulſe are now low and ſlow.

2. THIS Coldneſs and Trembling is ſoon ſucceeded by a violent Heat, a large, quick, and full Pulſe, and Difficulty of Breathing.

3. SOON after follows a great Thirſt, great Pain in the Head or other Parts of the Body, a Senſe of Wearineſs and Heavineſs, with an Averſion to all Kinds of Aliments except thin diluting Liquors.

4. The Tongue becomes dry, rough, and black; the Skin feels dry and hard, and the whole vaſcular Syſtem ſeems to be too elaſtic and tenſe; the Urine is Flame-coloured, and without any Sediment.

5. The Patient becomes very reſtleſs and delirious, and has very often convulſive Motions, or Spaſms, of the Muſcles.

These are the Effects of an acute continual Fever upon the Body; the Cauſe of which we will now endeavour to demonſtrate in as clear a Manner as poſſible.

1. That Coldneſs and Trembling which happen to Perſons in the Beginning of this Fever, is occaſioned by an Obſtruction of the Blood's Motion through the Capillary Veſſels of the Body, or in the ultimate

Branches of the ſanguine and lymphatic Arteries; and theſe Obſtructions always ariſe from the Diameter of the Blood-globules, or obſtructing Matter, being increaſed; for when the Blood-globules are diſtended by the Rarefaction of their contained Air, and thereby attract and retain a greater Quantity of the ſerous Part than they uſed to do; their Diameters muſt be enlarged, and of Courſe rendered incapable of entering into theſe minute Veſſels; whereby the Quantity of the Blood muſt be much increaſed in the larger Veſſels, and for a ſmall Time, till the Force of the Heart can overpower the redundant Load, the Body will be cold, and the Pulſe weak and ſlow.

2. THIS Coldneſs and Trembling is ſoon ſucceeded by a great Heat, and a ſtrong Pulſe; for the Courſe of the Blood being

more and more retarded in the ultimate Branches of the Arteries, and accumulated in the larger Arteries, the Circuit of the Blood will be much ſhorter, and its Return to the Heart much quicker, by which that Spring of Life will be obliged to increaſe its Contractions, and conſequently protrudes the Fluids through the Arteries with a greater Force, and Quickneſs, and thereby the Friction of the Fluids againſt their containing Veſſels will be greatly increaſed, and likewiſe the Action of the Veſſels upon the Fluids; whereby the Pulſe will be raiſed and a great Heat ſucceed.

3. Soon after follows a great Thirſt, &c. When the Velocity of the Blood is greatly increaſed, its Globules diſtended, and its ſerous Parts ſtrongly attracted, and retained, thereby; not only the Diſcharge by

the ſalival Glands, but all the glandular Secretions, will be greatly decreaſed. As, Firſt, the Blood-globules ſtrongly attract and retain a very great Quantity of the ſerous and lymphatic Parts. And, Secondly, its Velocity is ſo much increaſed that the ſerous Parts, yet at Liberty, have not Time to enter the Glands. The great Pains and Senſe of Wearineſs do ariſe from the Veſſels being greatly diſtended with a very hot Blood, by which they are very ſtrongly preſſed and irritated; and the Averſion to all Kinds of Aliments, except thin diluting Liquors ariſes from the great Heat, and the Fibres of the Body, being, as it were, parched; and thereby is ſuch a Senſation conveyed to the Mind that every thing is dreaded that tends to increaſe the Heat of the Fluids, or Contractions of the Fibres; and ſuch Things deſired as will cool and allay this Heat, and mollify the over-contracted Fibres.

4. THE Tongue becomes dry, rough, &c. For when its Juices, which are ſeparated by the ſalival Glands, as we have obſerved before, are retarded, the Fibres violently contracted, the Heat of the Body very intenſe, and the expired Air hot and full of acrid Particles, forced off from the Blood in the Lungs; it is impoſſible that the Tongue ſhould be otherwiſe than hot and dry. The Skin feels dry and hard, and the whole vaſcular Syſtem ſeems to be very tenſe and elaſtic; becauſe the Circulation, and glandular Secretions, in the Surface of the Body are greatly obſtructed, and the Fibres violently contracted, by the Heat and Irritation of their contained Fluids.

5. The Patient becomes reſtleſs, delirious, &c. We have before obſerved, that Sleep is a Kind of Ceſſation from all voluntary Motion and Thinking: and in the Time of Sleep all the Muſcles appropriated to voluntary Motions, are in a Kind of Relaxation or Looſeneſs, and all the antagoniſt Muſcles are in an Equilibrium and Equality of Action, not in the leaſt overpowering one another; and likewiſe there is not only procured a Suſpenſion from acting all voluntary Motions, but a Ceſſation from all ſuch Thoughts as will diſturb this tranquill Scene; and all the Fluids of the Body will be even and regular; and thereby all the lymphatic Secretions be greatly increaſed. Therefore, as long as the Fluids have this increaſed Velocity, and a ſuper-abundant Quantity abounds in the Body, thereby diſtending, preſſing,

and irritating the minute Veſſels of the Brain; as long as the Fibres are in this State of Tenſion and Elaſticity, and the Muſcles contracted; as long as this violent Heat continues in the Fluids, which thereby irritates the Fibres of the Body, and cauſes ſuch diſagreeable Senſations to be conveyed to the Senſorium Commune; as long as the Blood-globules are ſo much diſtended that they cannot enter the minute Veſſels of the Body, and the Circulation be carried on even and uniform; perpetual Watchings muſt conſtantly afflict the Patient, the Fibres of the Brain muſt be kept in a conſtant State of Tenſion, and a Delirium muſt be the Conſequence. Spaſms and convulſive Motions of the Fibres muſt ariſe from their being ſtrongly diſtended and irrritated by the Fluids; the increaſed Heat of which exalts their Salts and Oils to that Degree as to render them acrid.

The Urine's being thin and Flame-coloured without Sediment, is becauſe the increaſed Velocity of the Blood prevents its more groſs Parts from being ſeparated; and by the great Heat of the Blood will the Colour of the Urine be heightened. Sweat not appearing in this Diſorder, though the Heat is very violent, may be accounted for ſeveral Ways.

1. BECAUSE the Fibres of the Body are in ſuch a State of Tenſion, that the cuticular Glands are greatly contracted, and the Emunctories of Sweat, as it were, effaced.

2. BECAUSE the Blood-globules, being greatly diſtended, cannot circulate in the capillary Veſſels on the Surface of the Body, and Obſtructions are formed therein.

3. By the Blood-globules being diſtended, they attract and retain a greater Quantity of the ſerous Parts more than they uſed to do, and conſequently this and the other glandular Secretions muſt be much decreaſed.

PROP. III.

To deſcribe the Termination of the Diſeaſe, and the Conſequences which muſt neceſſarily follow.

This Diſeaſe muſt either terminate in Death, Health, or another Diſeaſe; therefore from the Violence of its Effects we muſt judge of its Termination; which will be found as follows.

1. This Fever terminates in Death, either from the Deſtruction of the Tone or

Elaſticity of the Fibres, or from the too great Force, Reſiſtance, or Acrimony of the Fluids, or from ſuch a Depravity of them, that they obſtruct all the minute Veſſels of the Body, eſpecially thoſe which greatly conduce to animal Life, or by which new Fluids ſhould be prepared to repleniſh the Place of thoſe which are conſumed. Which may be known by the following Symptoms. When the Fever begins with a Convulſion, or when convulſive Motions or Spaſms of the Tendons come on in the State of the Diſeaſe; when the Skin is parched and dry, and Sweat cannot be procured by any Medicine whatever; when the Diſeaſe is attended with a violent Vomiting, Diarrhœa, or Hiccups; when the Diſeaſe is attended with an involuntary paſſing of the Urine, and Stools; when a great Loſs of Memory, Lethargy, or violent Delirium attends; when a cold clammy Sweat breaks out upon the extreme Parts, and a violent Heat in the internal Parts: All theſe ſhew that the Solids are almoſt deſtroyed, and the Fluids in ſuch a depraved State, as renders them incapable ef performing the animal Functions, and except there is immediate Relief, the Diſeaſe muſt ſoon end in Death.

2. This Diſeaſe terminates in Health, whenever the material Cauſe is by the Powers of the Body, and Force of the Fever, ſubdued, reſolved, rendered duly fluxile with the circulating Fluids, and thrown off in the Form of inſenſible Perſpiration; which may be known by the Pulſe becoming even and regular, and the Patient falling into a gentle Diaphoreſis. This Diſeaſe may likewiſe terminate in Health, when the ſame Matter of the Diſeaſe is ſubdued, reſolved, and rendered

fluxile with the circulating Fluids, by the Powers of the Body and Fever as aforeſaid; but ſtill this Matter retains in itſelf ſome acrimonious Particles, which ſtrongly ſtimulate the Veſſels in circulating, and are, by their contractile Force, thrown off by ſome ſenſible Evacuation, which is commonly called a Criſis; as by a Diarrhœa, a violent Sweat, a Spitting, a large Flux of Urine, or a very great Sediment appearing in the ſame, and ſometimes by a violent Vomiting.

3. THIS Diſeaſe may terminate in another Diſeaſe, when, by the violent Velocity of the Circulation, and ſuperabundant Quantity of Blood, the Fibres of the Body are greatly ſtretched, *i. e.* the Particles of Matter whereof they are compoſed, are forced off from their Points of Contact, but not without the Sphere of Attraction, and

the Fibres of the Body are thereby greatly relaxed; and the fine lymphatic Parts of the Blood are forced off by the ſtrong protruding Force of the Heart and Arteries, and conſequently the remaining Maſs of febrile Matter is too thick and viſcid, and cannot be ſufficiently attenuated by the relaxed Veſſels, but is mixed with the circulating Fluids, 'till, in the Courſe of Circulation, it paſſes through ſome Veſſels that cannot give it ſo great Reſiſtance as the others: then it obſtructs, and accumulates upon, and gives Riſe to various other Complaints, as Tumours, Abſceſſes, Gangrenes, Shirrhi, &c.

PROP. IV.

To explain the Method of allaying thoſe violent Symptoms, and to entirely eradicate the Diſeaſe, when it is in the Power of human Art to do it.

HAVING therefore conſidered the Nature and Cauſe of this Fever, it will plainly appear that its Cure conſiſts,

1. IN leſſening the Quantity of the Blood.

2. IN attenuating, diſſolving, and diluting the remaining viſcid and glutinous Maſs.

3. IN ſheathing, abſorbing, and deſtroying all acrid, ſharp, and irritating Particles, abounding therein.

4. By condenſing the rarefied Air contained in the Blood-globules, and thereby leſſening their Diameters and attractive Force.

5. By rendering the Fibres of the ſeveral Parts of the Body more ſupple and flexible, particularly thoſe which ſurround and compaſs the ſecretory and excretory Ducts.

6. By decreaſing the too great and diſproportioned Force, with which the Blood is protruded againſt the Sides of its containing Veſſels,

Therefore, in order to anſwer the firſt Intention, we muſt lay it down as a Fact, that not any thing in the World is ſo efficacious here as Bleeding, which ſhould be repeated as often as the Symptoms require. For by Bleeding is the Quantity of the Blood immediately diminiſhed, and conſequently a leſs Quantity of that Fluid paſſes in equal Times through the Heart, as it finds a proportionably leſs Reſiſtance from the precedent Blood, whereby the Contractions of that Spring of Life will be decreaſed, and likewiſe the Velocity of the Blood in the Arteries; whence a great Diminution in the Strength of the Pulſe, and of Courſe in the Contractions of the Veſſels. Immediately after Bleeding, if the Patient has any Sickneſs, Reachings, or Pain at the Stomach, order a gentle Emetic, to cleanſe that Bowel; as, very often, the Stomach is ſo foul that it deſtroys the Effects of all our Medicines before they can reach the Blood. But if none of theſe Symptoms appear, omit the Emetic, and immediately throw up an emollient Clyſter to empty the Bowels, and to give a Diſcharge to any bilious or acrid Matter which may be forced upon them, and, in the State of the Fever, brings on a violent Diarrhœa, which, without great Precaution is taken, may end in Death. We ſhould likewiſe obſerve, that very often a Diarrhœa attends the Beginning of the Diſeaſe; then it will be neceſſary, after giving a gentle Emetic, to cleanſe the Stomach, (which very often contains a Load of viſcid and acrid Humours, which, when forced off by the violent Contraction of the Fibres, gives Riſe to this Symptom) to reſtrain this Flux gradually by the *Decoct. Alb.* or, if very violent, with ſmall Quantities of the *Decoct. Fracaſtorii Fulleri.*--To anſwer the ſecond Intention; immediately after thoſe Evacuations have been made, the Patient ſhould drink frequently of thin diluting

Liquors, made properly acid with the Juice of Lemons, or Oranges: Thin Broths will likewiſe be very uſeful here, which ſhould be made of Veal, Chicken, or the like.---To anſwer the third Intention the Patient ſhould be immediately put into a Courſe of the following Medicines.

℞ *Sperm. Ceti (in q. ſ. Vitel. ov. ſol.)* ʒſs. *Sal. Nitri* ℈j. *Aq. Alex. Simpl.* ℥ij. *Aq. Alex. Spt. c. Acet.* ʒij. *Syr. Balſ.* ʒiij. *M. f. hauſt. omni Trihorio ſumend. Superbibend. hauſt. Theæ Meliſſæ.*

By theſe likewiſe will the Rarefaction of the Blood-globules, by their contained air, be allayed, as nothing in Nature more effectually anſwers that Intention than *Sal. Nitri*; and conſequently a great Quantity of the ſerous Parts of the Blood, which before were inveloped in, and ſtrongly attracted, by the Globules, will be ſet at Liberty; and thereby the glandular Secretions will be increaſed, and the Body would be inclined to Sweat, but from the violent Contractions of the Fibres: To relieve which, by anſwering the fifth Propoſition or Intention, it will be neceſſary, beſides the frequent internal Uſe of emollient and diluting Liquors, to throw up frequently cooling emollient Clyſters; and to bathe the Legs, Feet, Arms, Hands, and Hypochondria, with emollient Fomentations, which ſhould not be much hotter than the preſent Heat of the Body. Theſe will be found of infinite Service, as we have often experienced: and they are likewiſe much recommended by that excellent Practitioner Dr. *Huxham.* For by theſe the Fibres of the Body will be relaxed, and, as being dry and parched, will abſorb a great Quantity of theſe emollient Particles, by which the capillary Veſſels upon the Surface of the Body will be ſoftened, and their Obſtructions thereby reſolved. We ſhall likewiſe add another Article which may be of great Service in this Caſe, and in ſhort in all inflammatory Fevers; that is, that the Patient ſhould hold his Head over the Steam of an emollent Fomentation, and receive the ſame into his Lungs with the Air: we have uſed this a great Number of Times, and find it of infinite Service in inflammatory Fevers, Peripneumonies, and Pleuriſies.

AFTER the Fibres are, by this Means, relaxed, and the Body brought in a Diſpoſition for ſweating, we ſhould immediately order Medicines of the following Kind, to increaſe that Evacuation, force off the viſcid obſtructing Matter which hangs on the capillary Veſſels, render theſe Veſſels duly pervious, and promote a free Circulation therein; thereby decreaſing the too great Quantity of Blood in the larger Veſſels, and its Force againſt their Sides, which will be anſwering the ſixth Intention.

℞ *Bezoar. Min.* ʒſs; *Sal. Succin. grs.* iv; *Conſ. fruct. Cynoſb. q. ſ. M. f. Bol. ſexta quaque hora ſumend. Superbibend. hauſt. ſeri vini.*

These ſhould be continued 'till the Signs of a Criſis appear, or, in ſhort, 'till a Criſis is performed, except any unforeſeen Symptom does contraindicate, which may be known by the violent Symptoms, which aroſe with the Fever, being abated; the Urine becomes leſs red and ardent, and depoſits a large Sediment, the Heat and Dryneſs of the Skin and Tongue, are conſiderably abated, the Patient falls into a gentle Sweat, and the Pulſe becomes even and regular.

As ſoon as we find the Criſis is performed, we ſhould immediately order a gentle Cathartic, to cleanſe the Bowels, as the exceſſive Heat of the Body muſt, of Courſe, generate a great Quantity of naſty ſtinking Fumes from the Fæces, if they are retained longer than ordinary; which may prove very detrimental to the Body; for which we would recommend ſome ſuch Medicine as the following.

℞ *Mannæ opt.* ℥j; *Juſcul. Avenac.* ℥ij; *M. Cui adde. Tinct. Rhab.* ℥j; *M. f. hauſt. Cath. mane cum Regimine ſumendus, & poſtea elapſis quatuor vel quinque Diebus, repetendus ad tres vices.*

When Bleeding has been neglected in the Beginning of the Diſeaſe, or the Patient has undergone a wrong Management, a Scene of the worſt of Symptoms will follow; the Plethora will increaſe, the Blood and Lymph grow more acrid, viſcous, and ſizy, and the capillary Veſſels will be kept in ſuch a State of Tenſion as to bring on a Delirium, Diſtraction of the Nerves, Spaſms, Inflammations of the Viſcera, &c. Here a great many of our modern Practitioners begin to order their Noſtrums, Specifics, and the whole Train of Quack Medicines, *i. e.* Bliſtering, and what they call Alexipharmic Medicines: we call them Quack Medicines, becauſe they cannot give a rational Account of their Operation in theſe Caſes. Now, what is more ridiculous, when they would allay the Heat of a Fever, ſoften and relax the Fibres, and abſorb the acrimonious Particles of the Fluids, than to apply a violent Stimulus to the Fibres, that are already too tenſe; to order hot Bolus's, Cordials, &c. to cool a hot Fluid? But our modern Practitioners, who think theſe will not finiſh the Work ſoon enough, ſtive up the Patients in hot Air, and almoſt ſtifle them with Bed-Clothes. Certainly if any thinking Man was but duely to conſider this Practice, he would utterly condemn it, becauſe he muſt eaſily conceive that the Blood cannot be cooled, nor the Fibres relaxed, by a violent Stimulus, nor Alexipharmic Boluſes, nor hot Air, nor a Quantity of Bed-Clothes, &c. but on the contrary that by theſe the Tenſion of the Fibres, and Heat of the Blood muſt be increaſed. The modern Practice is, in a great many Places, firſt to bleed, then bliſter, and that profuſely, then order Alexipharmic Boluſes, Cordials, &c.

and laſtly apply on Plaiſters or Pigeons to the Feet; and if Nature, after a long and ſevere Struggle, can overcome the Violence of the Diſeaſe, and the Force of their Medicines, theſe Practitioners are extolled to the Skies; but if Nature ſinks under her Burthen, and the Soul makes her Exit; Oh! it was done according to Art, and there was no other Remedy to be tried.

It is very certain that the Uſe of Bliſtering Plaiſters, where the Lymph abounds too much, where the Fibres are too lax and feeble, and when Nature begins to flag, *i. e.* when the Fibres begin to loſe their Contractions, by an oppreſſive Force, and the Blood to run into Grumes and Viſcidity, will be found of ſingular Service; by diſcharging the ſuper-abundant Quantity of Lymph, by increaſing the Contractions and Vibrations of the Fibres, and thereby increaſing their Action upon their contained Fluids, which, being propelled with greater Velocity than before, rebounds upon the Solids; and by this mutual Action and Re-action, is the whole Maſs again invigorated; from whence it will very plainly appear, that, in the Beginning of this Fever, where the Blood is already too hot and denſe, where the Fibres of the Body are too ſtrongly contracted, and all the Fluids tend to a State of alkaline Acrimony, this Method muſt be very pernicious. — Having ſufficiently ſhewn the Errors of this Practice, we will now proceed to point out the Method of relieving theſe violent Symptoms, which for the moſt Part attend this Diſeaſe when Bleeding and a proper Courſe of Medicine have been omitted; which are generally either a Delirium, Diſtractions of the Nerves, Spaſms, or Inflammations of the Viſcera; or a violent Diarrhœa, Doſing or Lethargy, Vomiting, and a violent convulſive Motion of the *Primæ Viæ*; to which add a great Heat and Dryneſs of the Surface of the Body, a Symptom common to both. And, firſt, when a Delirium and Spaſms attend the Diſeaſe, we ſhould immediately endeavour to allay the violent Tenſion of the Fibres by tepid Bathing, and drinking freely of warm thin diluting Liquors; by which Means the Fibres will be relaxed and mollified, as we have obſerved before, the obſtructing Matter of the capillary Veſſels ſoftened, and prepared for Expulſion, or be re-abſorbed by the refluent Blood, and the Action of the Veſſels upon the contained Fluids decreaſed: Afterwards we ſhould immediately order ſome ſuch Medicine as the following to promote a gentle Diaphoreſis.

℞ *Bezoar. min.* ʒſs; *Conſ. Cynoſb. q. ſ. M. f. Bol. omni triborio ſumend. ſuperbibend. hauſt. ſeqt.*

℞ *Aq. Alex. ſimpl.* ℥ij; *Sal. vol. ſuccin. gr.* xij; *Tinct. Caſt. Ruſſ. gt.* L; *Sp. nitri. dul. gt.* xx; *Syr. Balſ.* ʒiij; *M. f. hauſt.*

Theſe continued, with plentiful drinking thin diluting Liquors, ſeldom fail to remove thoſe Symptoms and bring on a plentiful Diaphoreſis. But if, notwithſtanding the Uſe of theſe, the Patient is afflicted with a Delirium or great Wakefulneſs; at the Time the Body is bathed with an emollient Fomentation, let the Head be bathed with warm Vinegar, which will be found of infinite Service.

But when a violent Diarrhœa, with a Doſing, Lethargy, or convulſive Motion of the Stomach and Bowels come on, the Caſe is very deſperate, and for the moſt Part ends in Death; however it is ſometimes curable; and certainly we ſhould never pronounce that diſmal Sentence to the Patient till the Soul makes her Exit, ſince we have ſome few Examples of Patients recovering when all our Hopes were paſt. In theſe Caſes we muſt endeavour to check the Flux by Stool as ſoon as poſſible, and encourage a Perſpiration. For which the *Decoct. Alb.* ſhould be drank freely, and every four or five Hours, three or four Spoonfuls of the *Decoctum Fracaſtorii Fulleri* ſhould be added; a Plaiſter of the *Emplaſt. Stomach.* ſhould be immediately applied to the Stomach, and every third or fourth Hour the following Bolus ſhould be ordered, and waſhed down with a Draught of the *Decoct. Alb.*

℞ *Confect. Damocrat.* ℈ſs; *Bezoar. min. pul. Caſt. Ruſſ. aa. gr.* xij; *Syr. Balſ. q. ſ. M. f. bol.*

BUT when all theſe have been omitted, and the Phyſician not called till the Diſeaſe is in its laſt and moſt diſmal Stage; that is, when no critical Diſcharge can be obtained by the Strength of Nature, but ſhe begins to ſink under her Load, the Fibres to loſe their Contractions and Vibrations, and the Fluids, for want of a proper Degree of Motion, begin to coaleſce and form Grumes, the Solids relax, the Pulſe grows low and ſlow, and often intermits, a Stupor, Subſultus Tendinum, and cold clammy Sweats appear, Nature being at her laſt gaſp;—here the Cure is very different from what it was before; all relaxing and cooling Medicines will now be very detrimental, and bring Death immediately. Now the Cure muſt be purſued with Cordial and nervous Medicines, ſuch as the following.

℞ *Bezoar. min. Caſt. Ruſſ. aa gr.* xv; *Camph. gr.* iij; *Conf. Cardiac.* ʒj; *Syr. Balſ. q. ſ. M. f. bol. ſexta quaque hora ſumend. ſuperbibend. hauſt. ſeqt.*

℞ *Aq. Alex. ſimp.* ℥iſs; *Sal. vol. Succin. gr.* xij; *Spt. Lavend. c.* ʒj; *Tinct. Croci, gt.* L; *Syr. Balſ.* ʒiij; *M. f. hauſt.*

THESE ſhould be waſhed down with large Draughts of ſome comfortable diluting Liquid; which are the moſt likely to give a gentle Stimulus to the Fibres, to diſſolve, and keep in a proper State of Fluidity the

Maſs of Fluids, that are now running into Coheſions and Grumes. Here Bliſters will be of great Service to give a Stimulus to the Solids, and relieve oppreſſed Nature. And if the Fibres have not entirely loſt their Contractions and Vibrations, and the Fluids are not ſo much corrupted as to be utterly incapable of performing the Functions of Life; ſuch Medicines as theſe may, by increaſing the Contractions and Vibrations of the Fibres, and giving a proper Motion to the Fluids, bring on a Criſis. If ſuch Medicines as theſe prove unſucceſsful, we ſhould immediately order others of the nervous Tribe, as they are the only Means we have to depend upon. We have attended Patients in this Diſeaſe when all theſe Medicines have been uſed in vain, and the poor Patient, as we thought, juſt going to launch out into Eternity, yet Nature only, after a ſevere Struggle, has brought on a critical Diſcharge, and the Patient been as it were ſnatched out of the Arms of Death.

From hence we may plainly ſee the Folly, not to ſay the Wickedneſs, of poſitively prognoſticating the Patient's Death. And *Hippocrates*, that eminent Prognoſticator, always pronounces them uncertain; likewiſe our great Practitioner *Boerhaave*, has aſſerted the ſame Thing: And our ingenious Countryman, Lord *Bacon*, obſerves, it is Quackery to pronounce Diſeaſes incurable, and that it is the only Means of ſcreening Ignorance from Reproach.

After the Criſis is performed, and the Body purged, as we have obſerved before, we muſt endeavour gradually to reſtore the Contractions and Elaſticity of the Fibres, and brace up the relaxed Veſſels, which may be weakened, either by the Contents of the larger Veſſels being forced into thoſe that are ſmaller, by the Violence of the Diſeaſe, creating Obſtructions, Inflammations, &c. or by the critical Matter being thrown on them. Here it will be very neceſſary for the Patient to obſerve a ſtrict Regimen, which ſhould be compoſed of Meats of the moſt eaſy Digeſtion, and greateſt Nouriſhment, and theſe taken in ſmall Quantities at a Time. Aſſes Milk will be found of great Service here, as will likewiſe Milk of any Kind. And if to theſe be added a gentle Exerciſe, and this in a clear Air, with a light ſtomachic Bitter, at proper Intervals, he will find his Conſtitution mend apace; his Fibres will be gradually brought to their Contractions and Vibrations, as before, and all the glandular Secretions will be properly performed, and Strength return much ſooner than it would otherwiſe.

CHAP. VII.

Of intermitting Fevers.

PROP. I.

To define the Nature and Cauſe of an intermitting Fever.

IN our preceding Chapters, we have obſerved, that the animal Body conſiſts of a Syſtem of Solids and Fluids, and that when the Body is in Health, there is a perfect Equilibrium between the contractile Force of the Solids, and the Reſiſtance of the Fluids. We have likewiſe obſerved, that when the animal Fibres, which compoſe the Veſſels, are too dry, elaſtic, and tenſe, and the Fluids too much in Quantity have too great a Velocity, or, from any Cauſe, are rendered acrid, an acute inflammatory Fever muſt be the Conſequence: And now we ſhall obſerve, that when the animal Fibres are too moiſt and flaccid, and conſequently the Veſſels relaxed, the Blood and Juices, eſpecially thoſe which circulate in the capillary Veſſels of the Body, being too viſcid, glutinous, and ſizy; an intermitting Fever muſt be the Conſequence: Which will be greater or leſs, in proportion to the Relaxation of the Veſſel, and the Degree of Viſcidity and Sizyneſs of the Fluids. For when the Fibres of the Body are ſtrongly enveloped in too great a Quantity of humid Particles, the Particles of Matter with which they are compoſed will be ſwelled, grow ſoft, and ſpungy; conſequently their attractive coheſive Force will be greatly decreaſed,

creaſed, and the humid Particles, getting in between the Particles with which the Fibre is compoſed, will force theſe Particles off from their Points of contact; whereby the Fibre grows flaccid, and the Veſſels, which are compoſed of a Number of theſe Fibres, relaxed.

The Veſſels, from the Flacidity of their Fibres, being relaxed, cannot give a proper Degree of Motion to their contained Fluids, and the Motion of the Fluids being abated, their Particles will begin to cohere more ſtrongly together, for want of a proper Degree of Motion and Attrition to expand their aerial Particles, and increaſe their centrifugal Force; hence the Fluids, eſpecially thoſe which paſs through the extreme Parts of the Body, become viſcid and glutinous, and rendered incapable of paſſing freely through theſe minute Veſſels.

Hence all the Secretions and Excretions will be greatly retarded, and all the Fluids in the capillary Arteries and Lymphæducts are become viſcid and glutinous, which increaſes gradually into the larger Veſſels, and a Plethora will be generated in the Body, by the Blood's Circuit being ſhortned; and the Blood begins to recoil upon the Heart, whereby the Circulation grows languid, both from the increaſed Quantity and Viſcidity of this Fluid; conſequently the Rigour of an aguiſh Paroxyſm will immediately begin, and continue 'till the Heart can redouble its Contractions and give the Fluids an increaſed Degree of Velocity, to force open the Obſtructions, and attenuate the viſcid Matter: Then the Fit terminates, in a great Heat of Body, which ends in a Sweat, and a turbid Urine.

We have already obſerved, that in Proportion to the Relaxation of the Veſſels, and Viſcidity of the Fluids, will the Fever be greater or leſs, *i. e.* will the Intervals of Time between the Fitsbe longer or ſhorter. In ſome Intermittents the Fit returns every twenty-four Hours; this Species being called Quotidian; and here the Relaxation of the Veſſels and Viſcidity of the Fluids are very great, and conſequently Matter enough generated to renew the Fit in this Time. In other Intermittents the Fit returns once every two Days; this Species is called Tertian; and the Veſſels here are not ſo much relaxed, nor the Blood ſo viſcid as in the laſt, thereby requiring a longer Time to generate a new Fit. In other Intermittents the Fit returns but once every three Days; this Species is called Quartan; and here the Veſſels are ſtill leſs relaxed, and the Fluids leſs viſcid than in the Tertian.

The procatarctic Cauſes of intermitting Fevers are a light, moiſt, foggy, Atmoſphere; too much Reſt or Inactivity, uſeing too great a Quantity of viſcid cold Aliments; or whatever cauſes a Relaxation of the Fibres of the Body, and too great a Viſcidity of the Fluids. Hence the Reaſon why intermitting Fevers or Agues, are always epidemic in low fenny Countries, or when the Air has been for ſometime replete with moiſt Vapours. A very moiſt Air is always more light than a dry Air, ſo that the Fibres of the Body muſt now be relaxed for two Reaſons:

1ſt. The humid Particles of the Air adhering to the Fibres of the Veſſels upon the Surface of the Body, diſunite their conſtituent Particles, as we have obſerved before; and,

2dly. ITS Preſſure upon the Body in general will be much decreaſed, and conſequently the Fibres much relaxed. From whence we may plainly ſee why Valetudinarians, and Perſons of weak Fibres, always complain of a great Heavineſs and Laſſitude when the Atmoſphere is light and moiſt, *i. e.* becauſe their Fibres are relaxed, and the attractive coheſive Force of their conſtituent Particles decreaſed, for want of a proper Preſſure, and from too great a Moiſture, of the circum-ambient Atmoſphere; by which the Fluids in the capillary Veſſels, for want of a proper Degree of Motion from thoſe Veſſels, begin to grow viſcid, and the Circulation languid, which gave Riſe to this diſagreeable Senſation that attends thoſe Perſons.

The Fibres may be rendered too lax and flaccid by too much Inactivity and Reſt; for by Inactivity and Reſt will the Quantity of the lymphatic Secretions be greatly increaſed, and the Quantity of the expurgatory Secretions be greatly diminiſhed, as we have obſerved before, whereby the active Particles of the Blood, will be enveloped in the ſuperabundant Quantity of this lymphatic Juice, and thereby do not give that Stimulus to the Fibres which is neceſſary to increaſe their Contractions and Vibrations, but lie like a Load againſt the Sides of the Veſſels; whereby they are diſtended, and conſequently relaxed. Now the contrary, *i. e.* Exerciſe and Activity, decreaſes the Quantity of the lymphatic Secretions, and promotes the contrary; thereby diſcharging the ſuperabundant Quantity of theſe Juices, which are repleniſhed by Reſt and Sleep; whereby the active Particles of the Blood are ſet at Liberty, and gently ſtimulate the Sides of their containing Veſſels, which increaſes their Contractions and Vibrations, and the Strength of thoſe Veſſels. Hence we may plainly ſee the Reaſon of the brawny Muſcles and Strength of Body of thoſe who uſe great Exerciſe.

The Fibres may be too much relaxed, and the Fluids too viſcid, and impoveriſhed, by uſing too great a Quantity of viſcid Food, *i. e.* whoſe Particles of Matter are very hard to be ſeparated, by the Action of the digeſtive Powers. If a Courſe of theſe Aliments be perſiſted in for ſome Time, they greatly corrupt the whole Maſs of Fluids, by repleniſhing them with ſuch Particles as are unfit for the Services of the animal Oeconomy, or ſuch as are, mixed with the Maſs of Fluids, not ſufficiently diſſolved to paſs freely through the minute Veſſels of the Body; whence proceeds, firſt, Obſtructions of thoſe minute Veſſels; ſecondly, a Viſcidity of the Fluids; and thirdly, a Relaxation of the Fibres which compoſe thoſe Veſſels.

PROP. II.

To explain the Effects of this Fever upon the animal Body.

In our former Propoſition, we have endeavoured to point out the Nature and Cauſe of theſe Fevers, and from the Cauſe therein deſcribed, we are now to explain the Effects of theſe Fevers upon an animal Body. A Paroxyſm of an intermitting Fever generally begins with a Yawning, Stretching, Coldneſs, Heavineſs, Trembling, Shivering, and Paleneſs or

Blueneſs of the extreme Parts; the Reſpiration becomes very difficult, and the Patient is oppreſſed with Anxiety, Sickneſs, and ſometimes a Vomiting. The Pulſe are low and ſlow; the Fleſh feels flaccid and cold; there is a general Laſſitude and Uneaſineſs over the whole Body, and for the moſt Part great Pains, either in the Limbs or Back; the Urine now is crude and very thin. And in Proportion to the Number and Violence of thoſe Symptoms, will the ſubſequent Paroxyſm be greater or leſs. Theſe are the Symptoms which are for the moſt Part obſervable in the firſt Stage of the Paroxyſm, commonly called the cold Fit, and are immediately followed by another Stage, which begins with a great Heat, Redneſs, ſtrong and free Reſpiration, a ſtrong Pulſe, violent Thirſt, great Pain in the Head and Limbs, and the Urine becomes red: At laſt the Patient falls into a profuſe Sweat; the Urine now appears thick and muddy, depoſiting a large Quantity of a gritty Sediment; and Sleep comes without leaving the leaſt Weakneſs or Uneaſineſs.

PROP. II.

To point out a Method to entirely eradicate this Diſeaſe.

In pointing out a Method to cure this Fever, the firſt Thing we have to obſerve is the natural Strength of the Patient's Fibres, and the Nature of his Fluids. Secondly, the Degree of Relaxation the Fibres are in, and the greater or leſs Viſcidity of the Fluids. And thirdly, the Seaſon of the Year and the Nature of the Atmoſphere. Firſt then, when the Patient is of ſtrong Fibres, the Relaxation of them very great, the Fluids very viſcid, and the Diſeaſe happening in the Spring Seaſon; its

Cure requires the anſwering of three Intentions. Firſt, to cleanſe the firſt Paſſages, which from the Weakneſs of their Fibres, by the general Relaxation, muſt be very foul, by a Load of undigeſted Matter. Secondly, to diſſolve the Viſcidity and Coheſions of the Fluids. Thirdly to brace up the relaxed Fibres, increaſe their Contractions and Vibrations, and enable them to give a proper Degree of Velocity to the Fluids, to prevent their falling into Viſcidity and Coheſions. Firſt, to cleanſe the firſt Paſſages there is not any thing in Nature anſwers better than a gentle Emetic: Such as the following.

℞ *Pul. Ipecacoanhæ* ʒſs; *Oxymel Scillit.* ℥ſs; *Aq. Flores Sambuc.* ℥jſs; *Spt. Sal. vol. Aromat. gt.* LX; *M. f. hauſt. emetic.*

THIS ſhould be taken about Three Hours before the coming on of the Paroxyſm;

oxyſm; and about one Hour after the Operation of the Emetic, give the following Draught.

℞ *Sal. Abſynth.* ʒſs; *Succ. Limon.* ʒvj; *cui adde Aq. Alex. ſimpl.* ℥iſs; *Extract. Gentian.* ʒj; *Syr. Cort. Aurant.* ʒiij; *M. f. hauſt.*

This Draught ſhould be repeated every three or four Hours, in the Interval between the Paroxyſms, for two or three Days, to anſwer the ſecond Intention; afterwards Medicines of the following kind, by bracing up the relaxed Fibres, and enabling them to give a proper Degree of Motion to the Fluids to prevent their falling into Coheſions and Viſcidity, and by their Effects upon the Fluids themſelves, *i. e.* Strengthening their Texture, will entirely eradicate the Diſeaſe.

℞ *Cort. Peruv. opt. pul.* ℥j; *Sal. Diuretic.* ʒiſs; *Extract. Gentian* ʒij; *Syr. Cort. Aurant. q. ſ. M. f. elect. de quo capiat. q. n. m. omni trihorio, abſente paroxyſmo; ſuperbibend. hauſt. theæ ſalviæ.*

SECONDLY, When the Patient is of very weak Fibres, paſt the Meridian of Life, or has been ſubject to the Jaundice, or Obſtructions of the Viſcera; the Emetic, to anſwer the firſt Intention, ſhould be ſomewhat weaker than that before deſcribed the Draughts ſhould be the ſame, to anſwer the ſecond Intention; but to anſwer the third Intention, it will be neceſſary to uſe ſuch as the following Draughts, with the cold Bath.

℞ *Decoct. Cort. Peruv.* ℥ij; *Extract. Gentian* ʒſs; *Sal. Succin. gr.* xv; *Syr. Cort. Aurant.* ʒiij; *M. f. hauſt. quarta quaque hora ſumend. abſente paroxyſmo.*

When the Fibres of the Body are not ſo much relaxed, nor the Fluids ſo viſcid, but their Lentor and Viſcidity are confined only to the moſt minute Series of Veſſels, which is the Caſe in that Species commonly called Quartan, the Diſeaſe is more difficult of Cure; eſpecially when it attacks People, who are ſubject to Obſtructions, of weak Fibres, or ſuch as are paſt the Meridian of Life.

In theſe Caſes, after having cleanſed the Stomach as before deſcribed, with ſome gentle Emetic, it will be neceſſary for the Patient to purſue ſuch a Courſe as the following,

lowing, to diſſolve the Viſcidity and Coheſions of the Fluids in the capillary Veſſels, before we dare give any thing to increaſe the Contractions and Vibrations of the Fibres.

℞ *Sal. vol. C. C. gr.* xv; *Succi Limon.* ℥ſs; *M. cui adde Eſſent. Antimonii,* ʒj; *Extract. Gentian.* ʒſs; *Aq. Alex. ſimpl.* ℥iſs; *Syr. Cort. Aurant.* ʒiij; *M. f. hauſt.*

THIS Medicine ſhould be repeated once every five or ſix Hours, and be continued for ten Days at leaſt; afterward, ſuch as the following ſhould be exhibited, to brace the Fibres, and ſtrengthen the Texture of the Fluids.

℞ *Pul. Cort. Peruv. opt.* ℥i; *Sal. Succin.* ʒiſs; *Syr. Cort. Aurant. q. ſ. M. f. elect. Capiat q. n. m. mag. quarta quaque hora, ſuperbibend. hauſt. ſeq.*

℞ *Aq. Alex. ſimpl.* ℥iſs; *Eſſent. Antimonii* ʒſs; *Spt. Lavend. c.* ʒi; *Extract. Gentian.* ʒſs; *Syr. Cort. Aurant.* ℥ſs; *M. f. hauſt.*

When theſe Paroxyſms happen to youthful plethoric Perſons, and tend to an inflammatory State, it will be abſolutely neceſſary to add Nitre to the Bark, in the Room of the foregoing Salts; and likewiſe to uſe proper Dilution.—When theſe Fevers happen in the Autumn, and more eſpecially, if the Atmoſphere, during our Courſe of Medicines, is very light, they will be found very difficult of Cure, and the Courſe of Medicines ſhould be longer continued: Sometimes it will be neceſſary to add cold Bathing to their Uſe. In the vernal Seaſon, the Spring of the Circumambient Atmoſphere is more ſtrong, for the moſt Part, and by its increaſing genial

Warmth, it rarefies and attenuates the viſcid Humours, which hang upon the Veſſels in the Surface of the Body; opens the Pores, which have been long contracted by the cold of the Winter, and thereby aſſiſts Nature to throw off a great Quantity of that viſcid Matter which relaxes the Fibres, and gives Riſe to this Diſeaſe.

SCHOLIUM.

FROM what has been ſaid with Regard to the Nature, Cauſes, and Method of Cure, of intermitting Fevers, we ſhall juſt obſerve, the Impoſſibility for any one Medicine in the World entirely to eradicate the various Species of theſe Diſeaſes, and the Abſurdity of ordering Specifics; eſpecially the Peruvian Bark as a Specific in this Diſeaſe. We will, in the Firſt Place, plainly account for the Operation of this Drug upon the animal Fibres and Humours, according to the Laws of Matter and Motion; and, Secondly, prove that there can be no ſuch Thing in Nature, as ſhe now ſtands conſtituted, as a ſpecific Medicine; and this we muſt likewiſe prove by the aforeſaid Laws.

FIRST, Then, we are to account for the Operation of the Peruvian Bark upon the Fibres and Humours of an animal Body. But, previous to this, we muſt examine into the Nature and Quality of this Drug, and likewiſe the Nature and Quality of the Fibres and Humours it is to act on. In the Compoſition of the Peruvian Bark we find three different Subſtances;

1. A GUMMY Subſtance, or the Juice of that Tree, from which it is taken, condenſed;

denſed; and this condenſed Juice has been found to conſiſt of ſuch Particles of Matter as are endued with a great attractive Force, *i. e.* ſuch whoſe Points of Contact are very great in Proportion to their Solidities.

2. A RESINOUS Subſtance, or the oily Particles of that Tree condenſed; and theſe oily Particles, beſides having a very great attractive Force, as all oily Particles are known to have, are hot and acrid, as all vegetable Oils are known more or leſs to be.

3. A woody Subſtance, or the Fibres of the Veſſels through which the Juices of the Tree are conveyed; this woody Subſtance is found to conſiſt of Particles which are endued with a very great attractive Force, as having large Surfaces in Proportion to their Solidities. This is the

Medicine which acts upon the Fibres and Humours; and now we will proceed to ſearch into the Nature and Quality of thoſe Subſtances which are acted upon by this Medicine.

First, Then the Fibres of the human Body, as we have already obſerved, conſiſt of Particles which are very elaſtic, and are conſequently endued with a very great attractive Force; and theſe Qualities increaſe or decreaſe in Proportion to the Warmth, Attrition, and Preſſure of the Fluids, and the Preſſure of the circum ambient Atmoſphere.

2. The Fluids of the human Body do conſiſt of Particles of Matter which are very elaſtic, and are endued with a very great attractive Force, as the Blood-Globules;

of Particles, whoſe attractive Force is much leſs than the former, as is likewiſe their Elaſticity, as the Serum; and of Particles which have a very great repulſive or centrifugal Force, as the Air which they contain. Now this centrifugal Force of the aerial Particles, which are contained in the Fluids, ſerves to keep this heterogeneous Maſs in a proper Degree of Fluidity, by keeping its contained Particles from running into too cloſe Contacts or Coheſions; and this Force is increaſed or decreaſed in Proportion to the aerial Particles contained therein, *i. e.* in Proportion to the Nature of the Aliments, whether they contain a greater or leſs Quantity of Air, and in Proportion as this Air is more or leſs expanded, *i. e.* in Proportion to the Heat and Velocity of the Fluids. This is the Nature and Quality of the Parts of the human

man Body, which are to be acted upon by the Medicine we have juſt now pointed out: and now we will examine what Effects this Drug muſt have on a human Body, which is known to conſiſt of ſuch Materials as we have juſt now deſcribed.

We have obſerved, in the Compoſition of the Peruvian Bark, a Juice, which is endued with a very great attractive Force, and an Oil, which, beſides a very great attractive Force, has a pungent or ſtimulating Quality, and a woody Subſtance, which we may very properly call an abſorbent. Now, from the Nature of the Fluids and Fibres of the human Body, we muſt eaſily conceive, that when a proper Quantity of this Drug is taken into the Body, there muſt immediately follow, firſt, a gentle Irritation of the Coats of the Stomach, by its oily Particles. Secondly, a Condenſation of the Juices of the *Primæ Viæ*, being ſtrongly attracted by, and united with, its gummy Subſtance, and abſorbed by its woody Subſtance; which, joined to a Contraction of the Fibres, from the gentle Stimulus given them by its oily Particles, muſt produce a Coſtiveneſs; and an increaſed Vibration of the Fibres of the Coats of the Stomach muſt enſue.

Soon after the moſt fine Particles of this Drug, being mixed with the Chyle, enters the Blood, particularly the gummy and reſinous Particles, as the woody Particles are not fine enough to enter the lacteal Veſſels, where they immediately begin to exert their Force, *i. e.* to attract and unite with the globulous part of this fluid, thereby making its Particles to cohere more ſtrongly, and conſequently increaſes their

Elaſticity; by which this Part of the Blood will be greatly increaſed, and its attractive Force made ſuperior to the centrifugal Force of its aereal Particles; and beſides this, the reſinous Particles which get into the Blood Veſſels have there their Effects, by ſtimulating the internal Coats of theſe Veſſels, thereby increaſing their Contractions and Vibrations, and conſequently their Action upon the Fluids; whence their Texture muſt be greatly ſtrengthened, and the Contractions and Vibrations of the Fibres greatly increaſed; and if the Uſe of this Drug be long perſiſted in, there muſt follow a Diminution of the Diameters of the containing Veſſels, from a great Contraction of the Fibres with which they are compoſed, and a condenſation of all the Fluids of the Body, by the Increaſe of their attractive Force; by which great Obſtructions muſt ſoon be formed in the lymphatic and capillary Veſſels, which will ſoon be increaſed to the larger Veſſels, and violent Diſeaſes muſt ſoon enſue. But when the centrifugal Force of the aerial Particles, contained in the Fluids, is ſuperior to the attractive Force of the Particles of the Fluids and they thereby tend to a State of Diſſolution, or when the Texture of the Fluids is weakened by any other Means, or when the Fibres are relaxed, and have loſt their Springineſs and Elaſticity, or when both theſe happen together; then will the Uſe of this Drug be excellent. Therefore in intermitting Fevers, after the Viſcidity of the Fluids is diſſolved, and the Veſſels rendered duly pervious, will this Drug be of excellent Service, by bracing up the relaxed Fibres, increaſing their Contractions and Elaſticity, and ſtrengthening the Texture of the Fluids, which muſt entirely eradicate this Diſeaſe.

But before the Viſcidity and great coheſive Force of the Fluids are diſſolved, and the Veſſels rendered duly pervious, the giving this Drug muſt increaſe the Viſcidity of the Fluids, and at the ſame Time brace up the Fibres; whence muſt ſoon follow, Obſtructions, and a numerous Train of Ills, as we have obſerved before.

THEREFORE let us behold, and that with Admiration, the ridiculous Aſſertions of thoſe who maintain that this Drug cures theſe (or in ſhort any other Diſeaſe,) by its ſpecific quality: a notion maintained by Men of great Eminence in the Practice of Medicine.

AND now having proved that the Cortex Peruvianus does not cure intermitting Fevers by any ſpecific Quality, but according to the Laws of Matter and Motion, by which all Medicines operate; as even the Intentions which are anſwered by this

Drug, towards the Cure of this or any other Diſeaſe, may be anſwered by any other Drug of the ſame Tribe, according to the Quantity of their attractive and ſtimulating Particles; we will next proceed to prove that there can be no ſuch Thing in Nature (as ſhe now ſtands conſtituted) as a SPECIFIC MEDICINE.

BUT, previous to the proof of this, we muſt obſerve, that there can be no material Subſtance in this Globe which has different Laws from thoſe by which all the other Parts of Matter are governed; for if there had been any ſuch material ſubſtance it muſt diſunite from, and be repulſed by, other Parts of Matter, and likewiſe repulſe all the Parts, and conſequently great Confuſion would be obſerved in Nature; but as at preſent the contrary is obſerved, we muſt conclude that no ſuch Thing does exiſt, and that all the Particles of Matter are governed by the ſame Laws, conſequently no ſpecific Medicine can exiſt. But we will, to humour thoſe Aſſerters of ſpecific Medicines, admit that there are in Nature ſome material Subſtances which are not governed by the general Laws of Matter, and that theſe Subſtances are governed by Laws unknown to any human Being; yet, admitting of this, there can be no ſuch Thing as a ſpecific Medicine; becauſe in moſt Diſeaſes there are ſeveral Intentions to be anſwered, ſome of which are as contrary to the others, as Wiſdom is to Folly; therefore any Medicine, which, by its ſpecific Quality, would relieve ſome of the Symptoms of the Diſeaſe, muſt encreaſe the others, and conſequently no Cure can be had thereby. Again, we will further admit that their ſpecific Medicine relieves the Diſeaſe by anſwering all the Intentions required for its Cure; yet there is ſuch a

Variety in the Conſtitutions of thoſe in whom the ſame diſeaſes happen, that a Medicine which cures a Diſeaſe in one, will not cure that ſame Diſeaſe in another, and conſequently that Medicine cannot be called a Specific: From whence it appears, that there can be no ſuch Thing in Nature as a SPECIFIC MEDICINE.

CHAP. VIII.

Of putrid Fevers commonly called Malignant.

PROP. I.

To define the Nature and Cauſe of putrid Fevers.

A Putrid Fever is a Fever which ariſes from a Diſſolution, and Putrefication of the animal Fluids. This Kind of Fevers is, by Phyſicians, ſometimes called Malignant; ſometimes Peſtilential, Petechial, &c. and theſe Names are very often given to Fevers of a different Kind, to hide Ignorance. But that we may be as explicit as poſſible in treating of the Nature and Cauſe of theſe Fevers, we will endeavour to point out the Nature and Cauſe of each Species of theſe Fevers, to which they are pleaſed to give theſe dreadful Titles.

FIRST then, we will point out the Nature and Cauſe of that Fever which they are pleaſed to call Malignant. This Species of the putrid Fever ariſes from a Diſſolution of the Craſſamentum or globulous Part of the Blood, which is ſoon followed by a Putrefaction of the whole Maſs: for when the Craſſamentum or globulous Part of the Blood is diſſolved, and thoroughly mixed with the ſerous Part, there muſt immediately follow, firſt, an Obſtruction of the capillary Veſſels, from the Contents of the larger Veſſels being forced into thoſe that are much ſmaller, as their Diameters now exceed the Diameters of the diſſolved Globules. Secondly, An inteſtine Motion of this diſſolved Maſs, from its not having a proper Degree of Motion. Thirdly, a Putrefaction of the ſame, being the Conſequence of the inteſtine Motion. This Diſſolution of the globulous Part of the Blood, ariſes, either from a very great Rarefaction of its contained Air, whereby its centrifugal Force is rendered much ſuperior to its centripetal, or attractive coheſive Force, or from the ſerous Part of this Fluid being replete with ſuch Particles of Matter as have a greater attractive Force than the Particles which compoſe the Globules, whereby their Attraction upon the Globules will be greater than the Attraction of the Particles which compoſe the Globules is on each other, conſequently the Globules muſt be diſſolved, and united with the ſerous Part.

THESE Particles of Matter muſt be ſuch as are angular, and have very large Surfaces in Proportion to their Solidities, ſuch are all Salts, particularly thoſe which are volatile and alkaline; therefore whenever the Blood is replete with Salts of any Kind, but particularly with thoſe which are volatile and alkaline, its globular Part muſt be diſſolved, and a Putrefaction enſue, as it muſt likewiſe when its aerial Particles are ſo much expanded, that the Particles which compoſe the Globules, are forced out of their Spheres of Attraction. Hence therefore the Antecedents of this Species of putrid Fevers muſt be, whatever cauſes too great an Expanſion of the aerial Particles contained in the Blood, as exceſſive heat, a very hot Atmoſphere, &c.

or this Fluid being replete with Salts, particularly thoſe of the alkaline and volatile Kind: hence the Reaſon why thoſe Perſons who live conſtantly upon ſalt Proviſions are ſo ſubject to this Diſeaſe.

Having pointed out the Nature and Cauſe of that Species of the putrid Fevers, which is commonly called Malignant; we will now proceed to point out the Nature and Cauſe of the Species which is called Peſtilential. This Species, likewiſe, is the Effect of a Diſſolution and Putrefaction of the Blood-Globules; but this, their Diſſolution, proceeds from a different Cauſe; for here the Craſis of the Blood is diſſolved, and a Fever generated, by a volatile Effluvia, with which the Air is impregnated, which enters into the Blood by the Lungs with the Aliment, and through the capillary Veſſels ſituated in the external Parts of the Body.

But, before we proceed to enquire how this volatile Effluvia produces ſuch Effects upon the human Body, we muſt enquire into the Nature and Cauſe of this Effluvia. It is certain that Effluvia of all Kinds are nothing elſe than a Diviſibility of the Particles of Matter, and this Diviſibility of Matter muſt proceed from whatever forces the Particles of the diſſolving Maſs out of their Spheres of Attraction; and conſequently they will begin to repulſe each other, till they are forced into the moſt minute Atoms; which is what we call the Effluvia of the diſſolving Maſs. Now this Effluvia will be found to conſiſt of the moſt active and volatile Particles of the diſſolving Maſs, as they are more eaſily divided than its more groſs and viſcid Subſtances; and as all Bodies, from whence an Effluvia can ariſe, muſt have in their Compoſition ſome volatile Salts and Oils, we muſt from thence conclude, that the Effluvia of all Bodies muſt conſiſt of their volatile Salts and Oils, minutely divided, and forming a Kind of volatile Sapo. This volatile, being repulſed by the Body of Matter from which it ariſes, will be ſtrongly attracted by, and united with, the Circumambient Atmoſphere, and is conveyed with the Air to Places very diſtant.

Now we muſt likewiſe obſerve, that as all Effluvia are of the ſame Nature and Quality of the Body from whence they aroſe, as being nothing elſe than its volatile Particles, ſo when theſe Effluvia are mixed with another Body, of the ſame Nature and Quality as that from whence they aroſe, they muſt produce the ſame Diſſolution and Diviſibility of Subſtance; as being ſtrongly attracted by, and united with, the moſt volitile Particles of the Body; whereby their Activity is very much increaſed, and an inteſtine Motion generated in the Body, by the increaſed Action of theſe Particles; and conſequently a Diſſolution of the Particles which compoſe the Body, from their being forced out of their Spheres of Attraction, by the inteſtine Conflict. Thus are Effluvia generated, and thus do they act upon other Bodies. Therefore in the Caſe before us, we may conclude, from what has been ſaid, that a Corruption and Diſſolution of the animal Fluids is no more than a Diviſibility of the Particles, whereof they are compoſed; and by this Diviſibility of their Particles, will their active Particles (which are their volatile Salts and Oils) be ſet at Liberty; and as they cannot fly off in Effluvia, becauſe of their containing Veſſels, they prey yet farther upon the remaining Maſs, till its Texture is entirely deſtroyed, and is rendered incapable of ſupporting Life: then the Veſſels likewiſe corrupt, and let thoſe volatile Particles fly off in great Quantities, which are attracted by the Air, and conveyed to other Bodies of the ſame Species, where the ſame Effects are produced as before. And thus are contagious Diſeaſes propagated.

Hence, therefore, the Antecedents of peſtilential or contagious Fevers muſt be, an Air that is replete with the Steams of rotting Animals; corrupt Food, as ſtale or ſtinking Meat, or ſtagnant or corrupt Water; or an Air that is replete with the Steams, or volatile Particles of the Excrements of living Animals; as in Jails, Camps, cloſe Cities, &c.

Thus having deſcribed the Nature and Cauſe of peſtilential and contagious Fevers; it now remains for us to deſcribe that Species of putrid Fevers, which is commonly called Petechial Fevers. And here we muſt ſay ſomewhat contradictory to ſome who have wrote on this Subject, by aſſerting that Petechiæ is a Symptom of putrid Fevers, and not a Fever of a different Kind, as has been aſſerted, and may be produced by either of the forementioned Cauſes, as may be plainly perceived when we point out the Cauſe of Petechiæ: Which may very plainly be demonſtrated to be no more than the diſſolved red Globules of the Blood, being forced into the minute ſerous or lymphatic Veſſels, upon the Surface of the Body, and thoſe Petechiæ,

chiæ, or Spots, muſt at firſt appear red, while the Blood in theſe minute Veſſels is in Motion, but afterwards, when the Blood begins to ſtagnate in theſe Veſſels, they muſt appear purple or livid. Thus we may plainly ſee, that thoſe Spots, or Petechiæ, may not only ariſe in every putrid Fever, but likewiſe in any other Diſeaſe where the Blood-globules are diſſolved, and the Diameters of their Parts are leſs than the Diameters of theſe minute Veſſels.

But we muſt farther obſerve, that inflammatory Fevers, intermitting Fevers, &c. may likewiſe give Riſe to a putrid Fever: As an intermitting Fever may be, by wrong Management, changed into a continual one, the viſcid Fluids, in the capillary Veſſels, ſo acted upon as to become acrid, and by an Acrimony will the Texture of the

Blood-globules be deſtroyed, and a putrid Fever enſue. Again, an inflammatory Fever may, at its Height, when the Heat and Acrimony of the Blood have been very intenſe, turn to a putrid Fever.

PROP. II.

To point out the Effects of a putrid Fever upon an Animal Body.

THE Effects or Symptoms of putrid Fevers are ſo many, that it is almoſt impoſſible to define or deſcribe them all; however we will endeavour to point out the moſt eſſential; and in order to be as accurate as poſſible, we ſhall deſcribe the different Stages of the Diſeaſe, with the Symptoms or Effects peculiar to each. Therefore,

FIRST, The Beginning of that Species which is commonly called Malignant, is accompanied with a general Laſſitude, Heavineſs, and Inactivity, as if the Patient had been tired with violent Exerciſe; a great Dejection of Spirits, Weakneſs, and Faintneſs, although no Evacuation has been made; cold Chills and Shiverings, which are ſoon ſucceeded by Heats, but not near ſo great as in the inflammatory Fevers we have already deſcribed, there is often a Pain in the Loins or Back, and ſometimes there is a Pain and Load at the Stomach, with Reachings, or Vomiting of black or corrupt Matter; there are Hæmorrhages often, from the Noſtrils, Gums, and other Parts of the Body; the Countenance of the Patient ſeems ſomewhat bloated, and more dead coloured than uſual, and his Eyes, for the moſt Part, heavy and dull: Very often there is a Pain in ſome Part of the Head, ſometimes over one or both Eye-brows, at other Times about the Occiput or Temples, with a *Tinitus Aurium.* The Pulſe are unequal, ſometimes more hard and quick than natural, other times ſmall, quick, and intermitting; the Urine is crude, pale, and thin; the Tongue is white, but daily grows more dark and dry. Theſe are the general Characteriſtics of this Fever, during the firſt, ſecond, and often to the fourth Day.

SECONDLY, In the Increaſe of the Diſeaſe all the fore-mentioned Effects are augmented; the Head-ach is greatly increaſed, with great Watchings, Coma, Delirium, and attended with great Horror and Deſpair; the Heat is much increaſed, and attended with a great Thirſt; the Reſpiration is for the moſt Part laborious, and interrupted with ſighing and ſobbing, and the Breath very hot and fœtid; the Tongue becomes black and furred, as do likewiſe the Teeth and Lips; the Pulſe becomes ſmall and intermitting, with a great Languor and Faintneſs; the Urine becomes clear and of a Citron Colour, and is often tinged with Blood, but as the Diſeaſe advances towards its Height, it becomes more dark, and ſmells very offenſive. Very often about the eighth Day, ſometimes ſooner, a violent Diarrhœa, or bloody Dyſentery, breaks out, and are always very dangerous; although a gentle Diarhœa may be of great Service, as Nature, ſometimes, takes this Method to throw off the morbific Matter; but the Stools, towards the State or Decline of the Fever, are always intolerably fœtid, livid, or black, and often attended with ſevere Gripings. Very often about the ſixth Day, or ſometimes not till the ninth Day, and at other Times about the fourth Day, Petechiæ break out, which are ſometimes red and bright, and ſometimes black, livid, or greeniſh; and by the Colour of theſe, may the Degree of Diſſolution of the Blood and Juice be known; for the more black and numerous the Spots are, the greater is the Diſſolution and Corruption of the Blood, and the more dangerous is the Diſeaſe; and the Contrary, when the Eruptions are florid and few.

Thirdly, TOWARDS the State of the Diſeaſe, all theſe Symptoms are yet more augmented; the Pulſe now becomes very ſmall and intermitting; the Eruptions begin to turn black; large black, or livid, Spots now appear, with Coldneſs of the extreme Parts; Stupor, Syncope, Subſultus Tendinum, Hiccups, and involuntary Effuſions of the Urine, and Fæces, with a Hardneſs and great Tenſion of the Belly: Theſe are the Symptoms which, for the moſt Part, accompany the State of the Diſeaſe, and except ſpeedy Relief can be given, Death muſt ſoon cloſe the Scene.

Fourthly, THE Effects of a putrid Fever, which owes it Riſe to Contagion, are much more quick, as this Fever ſeldom laſts above ſeven or eight Days, never above the tenth Day, and are as follows. The Patient is firſt attacked with a Yawning, Stretching, Laſſitude, and great Senſe of Wearineſs; and theſe are ſoon ſucceeded with a Coldneſs of the extreme Parts, and great Shuddering; great and ſudden Pains in the Head, Giddineſs, Loathing, Reachings, Hiccups, Vomitings, and a very great Trembling; the Pulſe are very low and intermitting; there is a very great inward Heat, and that chiefly about the Præcordia, and uncertain Sweats. About the ſecond or third Day the Patient becomes very reſtleſs, and ſoon after, either falls into a very great Stupor, or becomes delirious, with Convulſions; and theſe are ſoon followed with Carbuncles, Buboes, purple Spots, livid Veſications, or Hæmorrhages, and theſe laſt, without immediate Relief, with Death.

PROP. III.

To point out the natural Termination of thoſe Fevers.

THOSE Fevers may terminate in Health, Death, or in another Diſeaſe; therefore from the Violence of the Effects muſt be judged the Violence of the Cauſe, and from both the Termination of the Diſeaſe.

FIRST, then, When, the Pulſe are not greatly depreſſed and equal; when the Reſpiration is pretty free; when the Sick breaks out in gentle eaſy Sweats, about the ſeventh or eleventh Day; when the Urine becomes thick and depoſits a large Quantity of gritty Sediment; when the Eruptions are few, and thoſe bright and florid; when the Sick naturally inclines to Reſt, and his Eyes become bright and chearful; when, about the ninth, or tenth Day, a gentle Diarrhœa breaks out, by which the Patient is very much relieved; or when the Petechiæ diſappear, and ſoon after an itching, ſmarting, red Raſh breaks out, or ſcabby Eruption likewiſe, about the Lips, and Noſe, and the more angry theſe are the better: All theſe are Signs the Diſeaſe will terminate in Health.

Secondly, WHEN the Pulſe are very ſmall and intermitting; when the Reſpiration is very quick, and often interrupted; when the Skin of the Sick remains parched and dry, and the Tongue black and chapped;

when the Eruptions turn black or livid, and large black or livid Spots, like Bruiſes, appear upon the Surface of the Body; when a violent Diarrhœa breaks out, or a bloody Dyſentery, and the Sick has a comatoſe Phrenzy; when the Urine becomes black or livid, with a black Sediment, and paſſes off involuntary; when the Excrements paſs off involuntarily, and ſoon after the Belly becomes hard and tenſe; when violent Hæmorrhages break out; when the Patient chuſes to lie upon his Back with his Limbs ſtretched out, and catches at imaginary Flies; when there is a Subſultus Tendinum, Convulſion of the lower Jaw, and the Patient faulters in his Speech; when the Eyes are more ſorrowful, with involuntary Tears; when the Hypochondria are tenſe and inflated, with Hiccups; or when the Patient lies in a continual Stupor, or is in a continual Delirium:

lirium: All theſe are Signs that the Diſeaſe will terminate in Death.

Thirdly, THE Diſeaſe may terminate in another Diſeaſe, when, by the Uſe of Medicine, its natural Tendency to Death is ſtopped; but yet there is not Strength enough in Nature to throw the morbid Matter quite off the Body, by a critical Diſcharge, but lets it fall on the extreme Parts; whence proceed other Diſeaſes; which will be more or leſs acute according to the Quantity and Quality of the morbid Matter.

Fourthly, PESTILENTIAL or contagious Fevers do, for the moſt Part, tend to deſtroy the natural Craſis of the Blood, and conſequently the Life of the Patient; ſo that all the Patient's Hope, in theſe Caſes, muſt be from Art; except in ſome few

Caſes, where the contagious Matter is not very violent, where the Conſtitution is very good, or the Atmoſphere very dry and heavy.

PROP. VIII.

To explain the Method of removing the Cauſes and Effects of theſe Fevers.

WHEN we would remove the Cauſe and Effects of that Fever, which we call Putrid, and which a great many call Malignant, we muſt firſt ſet about deſtroying thoſe Diſſolvents by which the globulous Part of the Blood is diſſolved. Secondly, to ſupport the Contractions of the Solids, whereby to keep the Fluids duly fluxile. Thirdly, to diſcharge off the Body ſuch Particles of the diſſolved Fluids, as, by their Activity and Acrimony, will not be proper to circulate with the remaining Maſs.

And, fourthly, to reſtore the whole Maſs of Fluids to their natural Craſis, and ſtrengthen the Contractions and Vibrations of the Fibres.

Therefore, when a Phyſician is called in the Beginning of this Diſeaſe, he ſhould immediately ſet about preparing the Body to receive Medicines to anſwer the firſt Intention; which Preparation ſhould be always according to the Symptoms predominant. And, firſt, when the Patient is young and plethoric, or when the Attack of the Diſeaſe is violent, with great Heats, or when a Delirium is feared, it will be highly neceſſary to bleed; and the Quantity of the Blood to be taken away, ſhould be in Proportion to the Strength of the Patient, and Violence of the Symptoms. Perhaps this may ſeem a wrong Practice to ſome, becauſe of the great Sinking of the

Spirits, and ſudden Weakneſs, which are occaſioned by it, and becauſe of the Diſſolution of the Blood-globules; but we muſt tell thoſe Perſons, that both Theory and Experience order us to purſue this Method; as, by Bleeding, the Quantity of the diſſolved Maſs, or Moles Movenda, is leſſened, whereby the Fibres will be enabled to make much freer Oſcillations, and any inflammatory Obſtruction be prevented, which otherwiſe, in the Courſe of the Diſeaſe, might be attended with dangerous Conſequences.—When Bleeding is ordered in this Diſeaſe, it ſhould be ordered as ſoon as poſſible; as, in the Beginning, the Symptoms ſeem to demand it, *(viz.)* the ſharp Heat, tenſe quick Pulſe, Difficulty of Reſpiration, and violent Pain in one or more Places of the Body. The Blood now drawn does not ſeparate itſelf into Craſſamentum and Serum as does Blood at other

Times, but is a uniform Maſs, and of a very ſoft Conſiſtence, which very plainly indicates a Diſſolution of its Globules. Immediately after bleeding, or as ſoon as the Patient can recover himſelf from the fainting, which generally attends it in theſe Caſes, although the Patient is ever ſo ſtrong and robuſt, it will be neceſſary to order a Doſe of *Ipecacuanha*, or any other gentle Emetic, to cleanſe the Stomach, which, in theſe Caſes, is generally foul, and plainly ſhews itſelf ſo, by a Reaching, Vomiting, and Pain about the Præcordia. If a vomiting attends the Fever, after the Stomach has been cleanſed, order immediately ſome ſuch Medicine as the following Draught, and apply on an emplaiſter of *Emp. Stomach.* to the pit of the Stomach.

℞ *Sal. Abſynth.* ʒſs; *Succ. Limon.* ʒvj. *m. cui adde Aq. Menth. ſimpl.* ℥iſs; *Extract. Cort. Peruv.* ʒſs; *Syr. Cort. Aurant.* ʒiij; *M. f. hauſt. quarta quaque hora ſumend.*

It will be very neceſſary likewiſe to inject a laxative Clyſter of Milk, Sugar, Salt, and Lenitive Electuary, to unload the inteſtines, which, in the beginning of this Diſeaſe, will generally be conſtipated; but great Care muſt be taken not to bring on a Diarrhœa, which will be always attended with dangerous Conſequences, except it be very mild, and accompanied with a gentle breathing Sweat.

After having cleanſed the Primæ viæ, and emptied the Veſſels by bleeding, ſo much as to prevent an inflammatory Obſtruction; we muſt proceed to order ſome Medicines, to endeavour to deſtroy thoſe Diſſolvents, by which the globulous part of the Blood is diſſolved, and to ſupport the Contractions of the Veſſels, whereby to keep the Fluids duly fluxile, and from running into thoſe Grumes and unnatural Coheſions, which, without a proper Degree of Motion, they muſt now run into; for which thoſe of the following Kind will be found excellent.

℞ *Decoct. Cort. Peruv.* ℥iſs; *Sal. Nitri gr.* xvj; *Extract. Cort. Peruv.* ʒſs; *Aq. Menth. Simpl.* ʒvj; *Sp. Vitrioli gt.* xx; *Syr. Cort. Aurant.* ʒiij; *M. f. hauſt. quarta quaque hora ſumend. ſuperbibend. hauſt. Theæ Salviæ.*

Or when the Patient is of a weak Conſtitution, and the Heats are not great, we may order ſuch as are of the following kind.

℞ *Sal. Abſynth.* ℈j; *Succ. Limon.* ℥ſs; *m. Deinde adde Decoct. Cort. Peruv.* ℥iſs; *Aq. Alex. Spt. c. acet.* ʒij.; *Syr. Cort. Aurant.* ʒiij. *M. f. hauſt. omni Trihorio ſumend.*

In the Intervals of Time between the Uſe of theſe Medicines, the ſick Perſon ſhould drink freely of a Julep made of Port Wine and Water, of each equal Parts, and acidulated with Juice of Sevil Oranges or Lemons; or if ſome Tincture of Red Roſes were added, it would make it ſtill more efficacious.

By the Uſe of theſe Medicines will the attractive coheſive force of the Blood-Globules one to another, be greatly increaſed, their Texture will be ſtrengthened, and the Contractions of the Solids will be ſupported. The Uſe of theſe ſhould be continued on till the ſeventh or eighth Day, notwithſtanding Petechiæ appear ſooner. Afterward we ſhould proceed to order ſome Medicines to diſcharge off the Body by Perſpiration, ſuch Particles of the diſſolved Fluids, as, by their Activity and Acrimony, will not be proper to circulate with the remaining Maſs; for which we know of none that is better than the following.

℞ *Bezoar. min.* ʒſs; *Camph. gt.* vj. *Conſ. Cynoſb. q. ſ. M. f. bolus ſexta quaque hora ſumend. ſuperbibend. hauſt. ſeq.*

℞ *Decoct. Cort. Peruv.* ℥iſs; *Spt. Vitrioli gt.* xx; *Tinct. Croci* ʒi; *Syr. Cort. Aurant.* ʒiij; *M. f. hauſt.*

Or, if the Patient's Stomach will not bear the Bark ordered thus, omit the foregoing, and add the following Draught.

℞ *Sal. Abſynth.* ℈i; *Succ. Limon.* ℥ſs; *m. Deinde adde Aq. Alex. s.* ℥i; *Extract. Cort. Peruv.* ʒj; *Tinct. Cort. Peruv.* ʒiſs; *Spt. Lavend. c.* ʒi; *Syr. Balſ.* ʒij; *M. f. hauſt.*

Such Medicines as theſe may be continued on till the Criſis; with the diluting Julep as before; or, if the Patient does not like that, any other of the ſame nature may be ordered; but diluting will be found highly neceſſary at this time. If our Attempts to bring on a Perſpiration are vain, and inſtead of a Diaphoreſis a violent Diarrhœa breaks out, the Caſe will be dangerous; however we muſt endeavour to reſtrain the Flux gradually, with *Decoct. Alb.* in which boil ſome Tormentil Root, and Red Roſes; or the *Decoctum Fracaſtorii Fulleri*; which, in theſe Caſes, will be found excellent. But here a great deal of Caution is to be uſed; for if the Diſcharge ſhould be critical, to ſtop it prematurely would be attended with dangerous Conſequences; therefore it will be abſolutely neceſſary to premiſe a Doſe of Lenitive Electuary, or ſome other gentle Cathartic; to carry off any putrid Matter which may be forced on the Inteſtines.

WHEN a Delirium comes on, at any time of the Diſeaſe, and the Belly is bound, a lenitive Clyſter ſhould be immediately injected, and the following Draught uſed frequently, as the Caſe requires.

℞ *Aq. Menth. ſimpl.* ℥iſs; *Elix. Paregoric.* ʒj; *Sp. Vitrioli gt.* xx; *Syr. Papav. Errat.* ℥ſs; *M. f. hauſt. Anodyn.*

If this fail to procure Reſt, let the Patient's head be ſhaved and waſhed with warm Vinegar; which, with the Uſe of the foregoing, will be found to anſwer the End, when there is not an Inflammation of the Brain or any of its Meninges.

HERE, give us leave to ſay a Word or two on the Uſe of Bliſters, Hot Cordials, volatile Salts, &c. which are with ſome officinal Medicines the chief Dependance in theſe Diſeaſes. Hot Cordials, volatile Salts, &c. are very well known to diſſolve the Texture of the Blood, and conſequently, in theſe Caſes, muſt be very pernicious; as are likewiſe Bliſters in the Beginning of the Diſeaſe, when the Fever runs high; nay, even throughout the whole Courſe we cannot ſee any great good that can be procured by their Uſe, except towards the decline, when the Fibres grow torpid, the Circulation languid, and Nature wants a Spur. Here, indeed, they may be of ſome Service, but even now we would adviſe Camphire to be ſpread all over the bliſtering Plaiſters before they are laid on; as this Drug is certainly the beſt Corrector of Cantharides; and nothing in Nature more effectually deſtroys the ſharp Points of ſaline Bodies than this ſubtile Balſam.

BUT when, notwithſtanding our Endeavours, no critical Diſcharge can be procured, to throw off ſuch Particles of the diſſolved Fluids, as, by their Activity and Acrimony, cannot circulate uniformly with the remaining Maſs; but muſt diſſolve the whole Maſs, and bring it to Corruption, whereby the moſt violent Symptoms muſt ſoon ſucceed; as Stupor, Syncope, Tremors, Subſultus Tendinum, Coldneſs of the extreme Parts, Loſs of Motion, Mortifications, &c. and Nature ſeems to be at her loweſt Ebb, we muſt endeavour to ſupport the miſerable Patient with the moſt warm Cordials, Diaphoretics, &c. to the laſt; for we have ſeveral Inſtances of Perſons recovering even after all thoſe Symptoms have appeared. In theſe Caſes, bliſtering, as we have obſerved before, will be found of great Service, eſpecially when joined to Medicines of the following kind.

℞ *Bezoar. Min.* ℈j; *Confect. Cardiac.* ʒſs; *Camph. gt.* viii; *Conſ. fruct. Cynoſb. q. ſ. M. f. Bol. quarta quaque hora ſumend. ſuperbibend. hauſt. ſeqt.*

℞ *Aq. Alex. ſimp.* ℥iſs; *Tinct. Cort. Peruv.* ʒij; *Extract. Cort. Peruv.* ʒj; *Spt. Lavend.* ℥j; *Syr. Croci.* ʒiij; *M. f. hauſt.*

The Cure of Peſtilential or contagious Fevers ſhould be begun with vomiting, and that with a ſmart Vomit; and if the Inteſtines are loaded, they ſhould be emtied with a gentle Clyſter; afterward proceed to Diaphoretics, and the Cortex Peruvianus, as we have hinted before. Bleeding, in theſe Diſeaſes, will always be pernicious, notwithſtanding the Symptoms may run high, and in the Beginning ſeem to demand it. Camphire and Nitre joined to the Bark will be found of great Service here; eſpecially when the Blood is properly diluted with ſuch a ſubacid Julep as we have already recommended.

After the Criſis of theſe Diſeaſes is performed, we ſhould immediately order a gentle Cathartic to cleanſe the Bowels, and carry off any putrid Matter which may have been thrown thereon; which ſhould be repeated once every four or five Days, for three or four Times; afterward the ſick Perſon ſhould be put on a Courſe of Aſſes Milk, to which join Medicines of the following kind; to ſtrengthen the Texture of the Maſs of Fluids, and brace up the relaxed Fibres.

℞ *Pulv. Cort. Peruv. opt.* ℥iſs; *Rad. Gentian. Calam. Aromatic. Cort. Flav. Aurant. Hiſpal. aa.* ʒiij; *Coccinel.* ʒiſs; *Vin. Rub.* ℔ij; *Infunde frigide per ſex Dies. Colaturæ adde Elix. Vitriol. Mynſict.* ℥i; *M. capiat coch.* iv. *ter in die.*

CHAP. X.

Of the ſlow depreſſing Fever; commonly called the Nervous Fever.

PROP. I.

To define the Nature and Cauſe of this Fever.

IN defining the Nature and Cauſe of this Fever, it will be neceſſary for us, firſt, to obſerve its Antecedents, and the Nature of the Body in which it happens; whereby we ſhall be the better able to judge of its immediate Cauſe, and that from undoubted Facts.

Common Obſervation teaches us, that this Fever, for the moſt Part, attacks Perſons whoſe Fibres are very weak, and conſequently their Fluids are very thin and vapid: for as animal heat is the immediate Effect of the Motion and Attrition of the contained Fluids, and theſe, their Motion and Attrition, will be always in Proportion to the Strength and Elaſticity of the Fibres; therefore the Heat of the Fluids will be in Proportion to the Strength and Elaſticity of the Fibres. Now when the Fibres are weak and lax, the Heat muſt be weaker than when they are ſtrong and elaſtic. Again, this Fever is generally preceded by whatever relaxes the Fibres, and brings on a Viſcidity and Lentor in the Fluids which circulate in the capillary

Veſſels of the Body; as living too much upon cold viſcid Food; great Trouble and Anxiety of Mind; and immoderate Uſe of Venery; too copious Diſcharge of the moſt ſubtile Parts of the animal Fluids; or expoſing the Body indiſcretely to the Sun, or being too much fatigued in it.— When the Relaxation of the Fibres is very great, and conſequently the Heat of the Fluids much decreaſed, ſome of their Parts will be greatly diſſolved, and the attractive Force of the other Parts greatly decreaſed. For common Obſervation teaches us, that by an increaſed Degree of Heat will the animal Fluids be inſpiſſated; and by a Diminution of their natural Heat, will they be rendered much more thin and vapid. Therefore, from what has been ſaid, we may reaſonably conclude, that the immediate Cauſe of this Diſeaſe is a Relaxation of the Fibres, which compoſe the Veſſels, and too great Attenuation of the Blood and Humours; eſpecially of the Lympha; for want of a proper Degree of Heat and Motion, to preſerve their natural Craſis; whereby ſome Parts of the Fluids run into unnatural Coheſions and Grumes, whilſt others are rendered too thin and dilute, to ſerve for the Purpoſes of Life: whereby all the glandular Secretions will be greatly impaired: ſome letting the fineſt Part of the Fluids paſs thro' them in too great a quantity, whilſt others are obſtructed, and their Action almoſt deſtroyed, by being ſtuffed with their grumous Parts as we before obſerved. Whence a ſlow Circulation, and a Tendency to Stagnation, of the Fluids in the Brain; as that organ is compoſed of the moſt minute Tubuli; and conſequently a Diminution of all its Motions and Secretions; and of all the Senſes both internal and external, which are dependent on them; and a Stupor, or very great Wakefulneſs muſt be the Conſequences thereof: which are, for the moſt Part, the Effects of this Diſeaſe. A Delirium can never be the Effects of theſe Cauſes, except there is ſome Degree of Inflammation; which is very rarely the Caſe till the Fluids begin to fall into inteſtine Motions and grow acrid, and thereby irritate the minute Tubuli of the Brain; and this very ſeldom appears before the tenth or eleventh Day of the Diſeaſe. Therefore, we may conclude, that whatever will vitiate and impoveriſh the Blood, by cauſing too great an Attenuation of ſome of its Parts, and leaves the Remainder more groſs and thick; whatever will diminiſh the Secretion of the nervous fluid, or whatever will relax the Fibres, and render them too flaccid, may be the antecedent Cauſes of this Fever.

PROP. II.

To point out the Effects of this Diſeaſe upon the human Body.

It will always be obſerved, that for ſome time before the Attack of this Diſeaſe, the Patient finds himſelf low-ſpirited, inappetent, and ſeems loaded; he ſleeps very ill, frequently ſighs, and ſheds a great deal of involuntary Tears; he finds an inexpreſſible Diſorder and Dejection, which are accompanied with Fear and Concern. But when the Fever attacks in form, the Patient, at firſt, finds himſelf much more heavy and dull, with a Senſe of Wearineſs, and ſoon after feels ſome cold Chills and Shudderings, which are ſoon ſucceeded by Fluſhes of Heat, but not very violent. Soon after he finds his Spirits flag much, and has a great Load, or Pain of the Head, with a Nauſea, and often an Inclination to vomit, and has a very great Diſlike, or Diſreliſh of all Kinds of Aliments. When he vomits, nothing is thrown up but a little cold viſcid Phlegm. Theſe Symptoms, at firſt, will ſeem to intermit, but generally return with a great Aggravation towards Night; a Pain, like a Rheumatiſm, is felt in the Back or Loins, with an Oppreſſion of the Breaſt, Anxiety, and Sinking of the Spirits; the Head grows more heavy, or giddy, and the Heats gradually Increaſe; the Pulſe is low, quick, and unequal, ſometimes intermitting; the Urine is thin and for the moſt Part pale, and like vapid ſmall Beer, but without any Manner of Sediment. The Tongue, at the Beginning, is moiſt and white, but afterward becomes more dry and yellow. The Heats and Chills are very uncertain and unequal, ſometimes the Face glows with a ſudden Colour, while the other remote Parts are cold and covered with a clammy Sweat; the Thirſt is very little, the Sick ſcarcely ever complaining of Dryneſs. Theſe are the Effects of this Fever for the firſt ſeven or eight Days; to which we may add, a pale heavy Countenance, and a great Dulneſs of the Eyes, with a Stupor, or very great Wakefulneſs; which will ſometimes continue for ten or twelve Days: nay, we have often ſeen Perſons lye for a Fortnight together in this Diſeaſe without any Sleep, and that without a Delirium or Pain of the Head. About the ninth Day, the Heavineſs and Pain of the Head become much increaſed, with a conſtant Noiſe and ſinging of the Ears, which are very diſturbing to the Patient, and ſometimes towards the State of the Diſeaſe, bring on a Delirium. The Load on the Breaſt, Faintneſs and Anxiety now grow much more urgent, and when he is moved up to ſip his Liquors he often faints away. Cold clammy Sweats frequently break out ſuddenly on the extreme Parts; the Urine is now either more pale and lympid, or ſomewhat higher coloured, and more thick; when the former is the Cauſe, we may ſoon expect a Delirium with Tremors, and Subſultus Tendinum; but the Delirium, in theſe Caſes, is ſeldom very violent, and is frequently joined with Intervals of Doſing. About the tenth or eleventh Day the Tongue begins to grow dry, and profuſe Sweats break forth all at once; which, on the extreme Parts, are cold and clammy. Sometimes this Matter paſſes off with a violent Diarrhœa. However, either is very weakening. Frequently about the eighth or ninth Day of the Diſeaſe, Eruptions break out, which very nearly reſemble Millet Seed, and have made ſome Perſons call this the Miliary Fever. Theſe may break out ſometimes ſooner, ſometimes later, according to the Violence of the Diſeaſe; as they are nothing elſe than the attenuated Parts of the Blood forced into the capillary Veſſels, and from thence upon the Surface of the Body; and according to the Violence of the Symptoms will theſe Eruptions ſooner or later appear, or not at all.

About the fourteenth Day we may behold Nature ſinking apace, the extreme Parts grow cold and pale, the Pulſe trembling and fluttering, and ſcarcely to be felt; the Sick Perſon now becomes quite inſenſible, and a Coma appears, with vaſt

Tremblings, and convulſive Motions of the Nerves and Tendons; the Tears, Stools, and Urine run off involuntary; the Patient grows very deaf and ſtupid, ſo as not to be affected with the greateſt Noiſe. Thus does the miſerable Patient linger on till the eighteenth, twentieth, or ſometimes to the thirtieth Day; and ſometimes, unexpectedly, a Criſis is performed, and Nature is relieved, and very often the contrary. So that we ſhall, in our next Propoſition, endeavour to point out the natural Termination of this Diſeaſe; as it may terminate in Health, Death, or another Diſeaſe.

PROP. III.

To point out the natural Termination of this Diſeaſe.

According to the greater or leſs Attenuation of the Fluids, and the Relaxation of the Fibres, the immediate Cauſe of the Diſeaſe, will its Effects or Symptoms be greater or leſs; and according as the Symptoms are more or leſs violent, will its Termination be either in Health, Death, or another Diſeaſe; therefore, when its Effects are not very great, its Cauſe cannot be very ſtubborn to remove, and it may end in Health. As when the Attack of the Diſeaſe is not very violent, and not attended with a violent Pain or Giddineſs of the Head; when the Sinking of the Spirits and Sighing are not very great; when there is no Appearance of a De-a Delirium, Convulſion or Spaſm; when the Tongue continues moiſt, and a copious Spitting comes on; when there is a gentle warm Moiſture all over the Skin, or a gentle Diarrhœa, by which all the other Symptoms are relieved; when the Noiſe of the Ears or Deafneſs end in an Impoſthume of that Organ; when there is not a great Coldneſs, or cold clammy Sweat of the extreme Parts; when, after an Eruption comes out, thePatient is very much relieved, and falls into gentle refreſhing Doſings; and when the Pulſe beat even and regular, although low: when ſome or all of thoſe Symptoms appear, we may conclude, that with prudent Management, the Diſeaſe will terminate in Health.

But when from the Beginning the Sick Perſon has a violent Pain, like a Rheumatic Pain, in ſome Part of his Body;

when he has a violent Oppreſſion of the Breaſt, with Sighings, and a laborious Breathing; when in the Increaſe of the Diſeaſe, the Tongue becomes dry, and trembles much when the Patient endeavours to put it out, with a Difficulty of Swallowing, continual gulping or choaking in the Throat; when a Delirium, Convulſions, or Subſultus Tendinum, come on in the Increaſe of the Diſeaſe, the Urine at the ſame Time turning from a yellowiſh Colour to pale, and becoming very thin; when a violent Diarrhœa breakes out of a ſudden, by which the ſick Perſon is very much weakened and enervated; when the extreme Parts become cold and pale, and are covered with a clammy Sweat; when the Pulſe begins to tremble and flutter, or intermit, and the Patient becomes quite inſenſible and ſtupid, ſcarcely affected with the loudeſt noiſe; when the Tears, Urine, and Stools, run off involuntary, and the Nails begin to grow livid; when the Eruptions diſappear of a ſudden, and Convulſions, Delirium, or Subſultus Tendinum come on; or when the Eyes grow dim, and the Speech faulters, or the Patient begins to pick the Bed Cloths: when ſome or all of theſe Symptoms appear, we may conclude the Diſeaſe will terminate in Death.

When ſome of theſe dreadful Symptoms appear, tho', through the Aſſiſtance of Art, their Violence is broke, yet there is not ſufficient Strength in Nature to form a Criſis, to throw off the acrid Particles of the Fluids through the common Outlets of the Body; and ſhe lets them remain in the extreme Parts, ſometimes in one Part ſometimes in another; whereby various other Diſeaſes may be cauſed, according to the Nature of the Part where this acrid Matter is thrown: When this is the Caſe, this Diſeaſe may be very properly ſaid to terminate in another Diſeaſe.

PROP. IV.

To point out a Method of curing this Diſeaſe, as far as human Art is capable of doing it.

FROM what we have ſaid of the Nature, Cauſe, and Effects of this Fever, it will plainly appear, that all large Evacuations will be very detrimental herein, more eſpecially that of Bleeding; nay, we have ſeveral Times ſeen a common Purge attended with bad Conſequences, when exhibited in the Beginning of the Diſeaſe: However, it will always be found abſolutely neceſſary to order a gentle Emetic, to cleanſe the Stomach. It ſhould never be omitted when there is any Sickneſs at Stomach, Nauſea, or Vomiting; which will frequently be found to attend the attack of the Diſeaſe. If the Body is bound, a gentle Clyſter of Milk, Sugar, and Salt, may be ſafely injected; and be repeated every two or three Days, if there is Occaſion. Afterward we may order ſome gentle Diaphoretics and cordial Medicines, which ſhould be waſhed down with Sage Tea, Wine Whey, Barley Water, or ſome thin diluting Liquids: In theſe Caſes the following Medicines will be found very beneficial, increaſing or decreaſing the Doſe, according to the Strength of the Patient's Fibres, and Violence of the Diſeaſe.

℞ *Pulv. Contrayerv. Comp.* ℈j; *Bezoar. Min. gr.* xii; *Camph. gr.* iij; *Conſ. fruct. Cynoſb. q. ſ. M. f. bol. quarta quaque hora ſumendus, ſuperbibend. hauſt. ſeqt.*

℞ *Aq. Alex. ſimpl.* ℥iſs; *Pæon c.* ʒij; *Tinct. Cuſt. Ruf. gt.* xxx; *Syr. Balſ.* ʒiij; *M. f. hauſt.*

When the Patient has a very great Dejection of Spirits, with a Wakefulneſs and Anxiety, Bliſters ſhould be applied to the Arms, Legs, and Occiput, at proper Intervals; but we would always adviſe to omit the Bliſters in the Beginning of this Diſeaſe, except there is urgent Neceſſity for their Uſe; and to the Draughts ſhould be added of *Elixir Paregoricum*, thirty, forty, or fifty Drops, as the Caſe requires.

It will always be obſerved that ſtrong Opiates given in this Diſeaſe will be attended with bad Conſequences; but when the Opiate is given in ſmall Quantities and mixed with Camphire, it will always have very good Effects by bringing on a gentle Perſpiration and a Doſing, which are very refreſhing. And likewiſe it will always be obſerved, that the Patient is never ſo eaſy, as when in a gentle breathing Sweat. Therefore it will be found very neceſſary for him to dilute pretty freely with thin Liquids, ſuch as we have already obſerved, or Chicken Broth, which will be found excellent in this Caſe; and his Diet ſhould be Panada, Sago, Jellies, &c. to which we may add, occaſionally, a little Sack, or any other generous wine. The ſick Perſon, during the Increaſe of the Diſeaſe, ſhould be kept as quiet as poſſible, and profuſe Sweats ſhould never be encouraged; as they will always be attended with dangerous Conſequences; ſuch as a great Dejection of Spirits, trembling of the Pulſe, Syncope, and either a Coma, or a Delirium. Therefore we ſhould be very careful in the beginning of the Diſeaſe, how we attempt to force Sweats by volatile Salts, Spirits, and hot Cordials; and likewiſe how we apply on Bliſters too early, as they will be found to be frequently attended with ill Conſequences, although farther in the Increaſe of the Diſeaſe they may be very beneficial; but we would always adviſe the ſpreading of Camphire over all the Bliſters which are laid on in theſe Caſes; and thoſe who will take the Hint, will find it worthy their Notice. When Eruptions appear, Bliſters ſhould always be omitted, and the Eruptions be encouraged with gentle Diaphoretics. For when theſe Eruptions appear, it plainly teaches us, there is Strength enough in the Fibres to force out this acrid attenuated Matter upon the Surface of the Body; and that the Intention, which ſhould be anſwered by the Bliſters is anſwered by Nature. And if we, by theſe Spurs, endeavour to increaſe the Contractions of the Fibres, we may bring on Spaſms and convulſive Motions, and thereby withdraw this ſalutary Diſcharge.

But farther towards the State of the Diſeaſe, *i. e.* about the tenth or eleventh Day, we ſhall find the Symptoms increaſe, the Pulſe will be found very ſmall and unequal, though quick; the breathing will be thick and laborious, and attended with a kind of Sighing and Sobbing, great Load on the Breaſt, and Anxiety, with Spaſms of the internal and external Parts, although attended with no Inflammation; but they ſeem to ariſe from the Acrimony of the attenuated Matter, ſtimulating the Nerves of the Muſcles. In theſe Caſes it will be abſolutely neceſſary to apply Bliſters to the Arms, Legs, and Thighs, and immediately purſue the Uſe of the following Medicines.

℞ *Bezoar. Min.* ℈j; *Pulv. Caſt. Ruſ.* *gr.* viij; *Confect. Cardiac.* ℈j; *Syr. Balſ.* *q.ſ. M.f. bol. quarta quaque hora ſumendus, ſuperbibend. hauſt. ſeqt.*

℞ *Aq. Alex. ſimpl.* ℥iſs; *Sal. vol. Succin.* *gr.* xij; *Tinct. Caſt. Ruſ. gt.* LX; *Sp. Lavend. c.* ℥j; *Syr. Balſ.* ʒiij; *M.f. hauſt.*

Thin diluting Liquors ſhould be exhibited freely during the Uſe of theſe Medicines;

dicines; and if fifty or ſixty Drops of Tincture of Caſtor were given in theſe Liquids, in the Intervals of Time between the Uſe of the Boluſſes and Draughts, they would be found very beneficial. If a Delirium comes on, apply a large Epiſpaſtic to the Occiput, but be ſure let it be covered with Camphire; and to the Draught add of Elixir Paregoricum one Drachm, omitting the Spirit of Lavender. When great Tremors and convulſive Motions come on, omit the *Confectio. Cardiac.* in the Bolus, and ſubſtitute in its place Muſk ℈ſs or gr. xij; which will be found excellent therein; but we muſt not expect a regular Criſis here, as ſome Perſons have imagined, by a large Diſcharge from the Blood; for ſince the Diſeaſe did not ariſe from a real Plethora, there is no Occaſion of any ſuch large Diſcharge; all that

we

are to expect here, is a gentle Itching of the Body, and a breathing Sweat ſoon following it, a little Sediment in the Urine, two or three looſe Stools, a little Diſcharge from an Impoſtumation in the Ear, or in ſome other Part of the Body, and ſoon after an Abatement of all thoſe dreadful Symptoms. Sometimes this Matter will be thrown upon one of the great Organs of the Body, and other dangerous Diſeaſes enſue. Very often, about the Stationary Period of the Diſeaſe, the ſick Perſon falls into profuſe Sweats, which, according to our Obſervation, are not critical, but rather ſymptomatical; and oftentimes two or three Crops of Eruptions will ſucceed each other, nay, ſometimes we may obſerve four Crops; and all theſe without any great Relief to the Patient, except making him a little more eaſy. Theſe muſt certainly be very weakening, and greatly ſpin out the Diſeaſe. In theſe Caſes we have perſued the following Method with ſucceſs; and have likewiſe ſeen it countenanced by Dr. *Huxham*, a Gentleman to whom the World is very much indebted for Improvements in Medicine.

When there is a Tenſion or Pain of the Bowels, we firſt order one or two Drachms of Lenitive Electuary, or leſs, according to the Strength of the Patient, to cleanſe the Bowels, and carry off any putrid Humours which may have been thrown upon them; afterward we order Medicines of the following kind.

℞ *Decoct. Cort. Peruv.* ℥vj; *Sal. Succin.* ʒj; *Extract. Gentian.* ʒj; *Aq. Menth. pip.*

pip. ℥iſs; *Syr. Cort. Aurant.* ℥j; *M. f. miſtura. Capiat Coch.* iij *quarta quaque hora.*

Or, when the Stomach is very weak and cannot bear the aforeſaid Medicines, ſuch as the following may be found very ſucceſsful.

℞ *Sal. Abſynth.* ℈j; *Succ. Limon.* ℥ſs; *M cui adde Aq. Alex. Simpl.* ℥j; *Extract. Cort. Peruv* ʒſs; *Tinct. Croci. Sp. Lavend. c. aa* ʒj; *Syr. Cort. Aurant.* ʒij; *M. f. hauſt. ſexta quaque hora ſumend.*

Such Medicines, uſed in the Decline of theſe Fevers, will always be found of infinite Service, by ſhortening their Decline, which otherwiſe will very often run out to the thirtieth Day or longer. But if the Patient, during their Uſe, becomes coſtive, he ſhould take a ſmall Quantity of Lenitive Electuary every two or three Days, (viz.) as much as will give a looſe Stool, or two; but great Care ſhould be taken not to bring on a Diarrhœa, as it will always be attended with dangerous Conſequences.

WHEN the febrile Symptoms are allayed, it will be neceſſary for the Patient (who will then be in a very weak diſpirited Condition, from the great Weakneſs and Relaxation of the Fibres and Attenuation of the Fluids) to be very careful in the Uſe of the Non-naturals, and particularly in the Uſe of his Aliments; as his digeſtive Powers are very weak, and conſequently uſing too great a Quantity of Food at a Time, or uſing ſuch a

Food as is very hard of Digeſtion (or where is Particles of Matter very ſtrongly cohere together) will be found, not only to fill the Body with Crudities and undigeſted Juices, but to generate Obſtructions, and relax the Fibres yet more. In theſe Caſes we would adviſe him to purſue a Courſe of Aſſes Milk, with white Meats, Vegetables, and all Kinds of Aliments which are very eaſy of Digeſtion; to uſe gentle Exerciſe as his Strength will bear; and to uſe the following ſtomachic bitter Wine, with ſome Doſes of Rhubarb occaſionally, as the Caſe re-

℞ *Cort. Peruv. opt. Pulv.* ℥iſs ; *Rad. Gentian. Calam. Aromatic. Galang. Zedoari. Flor. Chamæm. Contuſ. aa* ʒij ; *Vin. Rub.* ℔ij ; *Infunde frigide per ſex vel octo Dies. Colaturæ adde Eſſent. Antimonii Hux.*

℥j ;

℥i; *Sal. Diuretic.* ʒiij; *M. capiat coch.* iv *ter in die.*

By the Uſe of theſe will the Fibres of the Body be gently ſtimulated and contracted, the Texture of the Fluids ſtengthened, and the whole vaſcular Frame be rendered duly elaſtic and tenſe; and conſequently all the Secretions and Excretions be performed in the uſual and regular Manner.

CHAP. XI.

Of the SMALL POX.

PROP. I.

To define the Nature and Cauſe of the Small-Pox.

TO reſolve this Propoſition, according to the Laws of Nature, will be a Taſk which is both very difficult and intricate; a Taſk which has puzzled the greateſt Phyſicians ſince this Diſeaſe has appeared in the World, and which is (as far as we have ever heard of) ſtill unreſolved. But by what means is it that Phyſicians of all Ages have been ſo puzzled to account for the Cauſe of this Diſeaſe? It is certainly becauſe they purſue a wrong Courſe to diſcover ſuch Phænomena; it is becauſe they build their Structure only upon mere Conjecture: Some endeavouring to perſuade Mankind that the variolous Contagion ariſes from ſome occult Qualities in Bodies, and is therefore paſt Man's Comprehenſion to diſcover; others accounting for its Cauſe from the Influence of the Planets; others from the Malignity of the variolous Matter, &c. with various other ridiculous Whims, which are not only groundleſs, but abſurd in themſelves. All theſe empty Notions we muſt lay aſide, and endeavour to reſolve this Propoſition according to the genuine Laws of Matter and Motion, by which all the Diſeaſes incident to human Bodies are to be accounted for: ſince, it is very certain, that there is not the leaſt Particle of Matter in the Univerſe, but what muſt act by, and conformable to, theſe Laws.

It is a well known Axiom, that ever ſince this Diſeaſe firſt appeared in the World, it has been an epidemical, or contagious Diſeaſe. It is epidemical, becauſe the Effluvia of the ſick Perſons who labour under this Diſeaſe is ſtrongly attracted by the Air, and is conveyed with its current to diſtant Places, and there enters the Bodies of Animals with this Fluid in Reſpiration; where it produces its Effects, according to the Nature and Texture of the Fluids of the Body into which it is received. This infected Air may likewiſe be attracted by ſome of the Juices of the Mouth, and ſo will be ſwallowed with them down into the Stomach, and from thence be conveyed to, and mixed with, the Blood by the Lacteals. Now common Obſervation teaches us, that the Air, thus impregnated with this variolous Effluvia, may be received into the Bodies of ſome Perſons and produce no viſible Effects; and in thoſe Bodies where it does produce any Effects, thoſe Effects ſhall be very different, although the Air is equally impregnated with this volatile Matter; and likewiſe that the Bodies, in whom this Matter has once produced its Effects, will never be ſubject to them again, although ever ſo ſubject to any other epidemic Diſeaſe. This will appear very wonderful to ſome, and ſeem to countenance the Notions we have already rejected. But when we examine the Matter with a little more Attention, we ſhall be able to give a rational Account for theſe Phænomena, according to the Laws by which all material Bodies are known to be governed.

It is certain that all Effluvia, as we have already proved, are nothing elſe but the moſt fine and volatile Particles of the Bodies from whence they ariſe; which are developed, and forced out of their Spheres of Attraction, by an inteſtine Conflict in the heterogeneous Maſs of Particles with which the Bodies are compoſed. This volatile Matter, whoſe conſtituent Particles are very ſmall, and conſequently have large Surfaces in Proportion to their Solidities, is ſtrongly attracted by the circumambient Atmoſphere, and is, with the current of Air, wafted to diſtant Places, where it is conveyed into the Blood, by the Lungs, with the Aliments, and ſome think through the cuticular Glands, where it produces different Effects, and ſometimes none at all, according to the Nature of the Body into which it is received. Therefore, in this Caſe, we muſt now endeavour to point out, firſt, how the general Effects of this Effluvia are produced in the human Body. Secondly, why it produces different Effects in different Bodies. Thirdly, why it may ſometimes be received into the Body without producing any Effects at all. And, fourthly, how Perſons, whoſe Fluids have once been impregnated or diſſolved with this Matter, will never ſuffer any ill Effects from it again, although it is ever ſo epidemical, and their Bodies ever ſo capable of receiving any other epidemic Diſeaſe.

FIRST, Then, we are to point out the Reaſons how and why the variolous Effluvia produces its general Effects in the human Body: Which we ſhall do as follows.

THE variolous Effluvia being received into the Blood by the Lungs, by the Alimentary Tube, and by the Perſpiratory Ducts, as we have obſerved before, is carried with that Fluid into the moſt remote Parts of the Body, ſo that all the whole Maſs of Fluids is ſaturated with it; and, as we have elſewhere obſerved, it will be ſtrongly attracted by that part of the Fluids from whence it was developed and ſet at liberty, *i. e.* the Blood-Globules, and immediately, as being an active volatile Matter, it brings on a Fermentation in their contained Subſtances; which ſoon deſtroys their Elaſticity and attractive Force, and brings them to a State of Diſſolution. The Blood-Globules being diſſolved, and their volatile Particles developed and

ſtrongly

ſtrongly attracted by this variolous Matter, begin to grow acrid, and to irritate the Coats of their containing Veſſels; and by this Irritation will the Contractions and Vibrations of the Fibres be increaſed, and the Contractions of the Heart and Arteries muſt of courſe be more frequent and ſtrong; and in proportion to the Increaſe of theſe will the Velocity of the circulating Fluids be increaſed, and conſequently their Heat; and in Proportion to their increaſed Velocity and Heat, will their aerial Particles be expanded; and in Proportion to the Expanſion of their aerial Particles will the Blood be rarefied and inflamed: Which, joined to the Diſſolution of its Globules, as we have before obſerved, muſt bring on a Train of violent Symptoms; ſuch as muſt always be the Effects of an increaſed Heat and Rarefaction of the Blood, and a Diſſolution of its Globules. And as this variolous Matter is ſtrongly attracted by, and united with, the moſt fine and volatile Particles contained in the Blood-Globules, when the Globules are diſſolved and theſe active light Particles developed and ſet at liberty, they will be the moſt eaſy to be protruded to the Surface of the Body by the increaſed Velocity of the Circulation; where they are forced into the minute Veſſels, with ſuch Impetuoſity as to greatly diſtend them, even to raiſe them above the Surface of the Body in the Form of Puſtules; and immediately after, the Fever and Train of Symptoms, occaſioned thereby, ceaſe: Although it continues, in a ſmall Degree, for ſome time, for the Reaſons we have already obſerved in Chapter IV. Thus are produced the general Effects of this variolous Effluvia upon the human Body. And now we are to proceed to ſhew the ſecond thing which we propoſed, *i. e.* to point out the Reaſons how and why it produces different Effects in different Bodies. But previous to theſe, we muſt obſerve, that the human Body is compoſed of Solids and Fluids, and theſe Solids and Fluids may have different Degrees of Elaſticity and Motion, and in Proportion to their greater or leſs Elaſticity and Motion will the Strength of their Texture be; and in Proportion to the Strength of their Texture, will they be more or leſs eaſy to be divided, when a Fermentation is raiſed in their contained Subſtances; and in Proportion as their Parts are more or leſs eaſy to be divided will the Effects produced thereby be greater or leſs. Hence, therefore, in Proportion to the Strength and Elaſticity of the Fibres, and Texture of the Fluids, will the Effects of the variolous Effluvia be greater or leſs: Which is what common Obſervation does likewiſe teach us. For when this Effluvia is received into the Body of a Perſon whoſe Fibres are ſtrong and elaſtic, and whoſe Blood is of a good Texture, it cannot poſſibly produce ſuch a Diſſolution of the Globules, and ſuch a Train of violent Symptoms, as when it is received into the Body of a Perſon whoſe Fibres are weak and relaxed, and whoſe Blood is looſe and eaſily diſſolved; for the former will give a great Reſiſtance to the Fermentation cauſed by the variolous Matter, and conſequently ſo large a Quantity of the Blood-Globules will not be diſſolved; but the latter will not only give no Reſiſtance to the Action of the variolous Matter, but does rather ſeem to forward its Action, and the Diſſolution of the Blood. Hence a Train of more dangerous Symptoms will follow, which will terminate in that Species of this Diſeaſe, commonly called the Flux-Pox, or confluent Small-Pox: Whereas the Eruptions of the former will be what is commonly called the regular Small-Pox; and we may as ſoon expect to ſee Snow in June, in our temperate Climate, as to ſee the Confluent Small-Pox happen to a Perſon whoſe Fibres are ſtrong and elaſtic, and whoſe Fluids have a good Texture. I mean when the Management is left to Nature; for very often we may ſee Perſons of ſuch a Conſtitution fall into the Hands of an old Woman, or *un Medicin malgré lui*, who will ſo break his Conſtitution by a hot Air, hot Cordials, and Bliſters, that they may, by their Art, force out ſuch a Quantity of Eruptions, as may be like the Confluent Species, and which Nature never intended. On the other hand, we ſhall very rarely ſee a Perſon, whoſe Fibres are weak and relaxed, and whoſe Blood is looſe, and tending to a Diſſolution, have the Regular Small-Pox, notwithſtanding all that Art can do to his Aſſiſtance. Therefore, as we have already obſerved, the Effects of the variolous Matter upon the human Body will be greater or leſs, in Proportion to the Strength of the Fibres, and Texture of the Fluids.

To proceed to the third general Head, *i. e.* to point out the Reaſon why this variolous Matter may ſometimes be received into the Body without producing any Effects at all. We have juſt now proved, that the Effects of this variolous Matter will be the greater upon the human Body, in Proportion to the Weakneſs and Relaxation of the Fibres and Texture of the Blood-Globules, *i. e.* in Proportion to their attractive coheſive Force; and likewiſe as the ſerous Part of that Fluid has a greater or leſs attractive Force, or is more or leſs impregnated with ſaline Bodies, which are known to diſunite its Particles: and, farther, as the Secretions and ſecreted Liquids are more or leſs uniform and regular: and we ſhould likewiſe have added, as the Atmoſphere is more or leſs cold or hot, heavy or light; as this is very often a material Circumſtance in theſe Caſes. For according as its Preſſure is more or leſs, will the Fibres of the human Body be more or leſs contracted; and according to its Heat and Coldneſs, will the aerial Particles contained in the Fluids be more or leſs expanded, and conſequently the Fluids rarefied and inclinable to favour the Action of the variolous Matter. Therefore from what has been ſaid, we may plainly conclude, that when the Fibres of the Body are ſtrong and elaſtic, the Blood-Globules of a good Texture, and conſequently their moſt active volatile Particles, which are known to attract this variolous

Matter with the greateſt Force, enveloped in their oily and firmly cohering Particles; when the Serum is likewiſe of a good Conſiſtence, and not too ſtrongly impregnated with ſaline Bodies, which are known to diſſolve its Subſtance, the Secretions, and the ſecreted Liquids, uniform and of a proper Conſiſtence; and when the Atmoſphere is tolerably cold and heavy: I ſay, when theſe happen together, this variolous Matter may be received in the Body, and produce no viſible Effects. As, firſt, its active volatile Particles will be greatly condenſed by the Atmoſphere. Secondly, When they are received into the Body, their Action will be much retarded by the Reſiſtance they will meet with from the ſtrong attractive Force of the Particles of the Fluids to each other. Thirdly, The moſt active volatile Particles of the Fluids, by which theſe are known to be moſt attracted, are enveloped in their oily and firmly cohering Particles, and conſequently will not attract this variolous Matter with a ſuperior Force to that of the more viſcid and denſe Particles. And, Fourthly, as this variolous Matter being much condenſed by the Air, has an equal Degree of Attraction with all the Particles of the Blood; as the whole Maſs is of a good Conſiſtence, and firmly cohering, its active Particles yet remaining will be enveloped in the oily and more denſe Particles of that Fluid, and conſequently be rendered inactive, and produce no Effects at all.

How Perſons, whoſe Fluids have once been ſaturated or diſſolved by this variolous Matter, will never ſuffer any ill Effects from it again, although ever ſo epidemical, and their Bodies ever ſo capable of receiving any other Diſeaſe, is what remains now to be treated of. It is certain that the Texture of our Fluids is compoſed of Particles of Matter which have various Degrees of Attraction and Repulſion, and conſequently have different Surfaces in proportion to their Solidities; and likewiſe it is plain, that thoſe Particles, which are the moſt fine and volatile, are endued with the greateſt attractive Force, as their Surfaces are very large in Proportion to their Solidities; and thoſe Particles of our Fluids, which have the greateſt attractive Force, will always be found to attract the variolous Effluvia, or indeed any other contagious Effluvia, according to their Denſity, with a ſtronger Force than the other Parts of our Fluids; and conſequently the contagious Matter exerts its greateſt Force upon theſe Particles (as we have already obſerved) as it is by them moſt ſtrongly attracted and retained; whereby their Texture will be deſtroyed before it begins to prey upon the more denſe Particles; and thereby all their diſunited Subſtance, with the variolous Matter, will be the firſt Particles that are protruded to the Surface of the Body, and the other Particles, which are the leaſt denſe, will be the next which will be diſſolved, and ſo on, in Proportion to the moſt denſe. Now when the moſt fine and volatile Particles of the Blood and Juices are deſtroyed by the variolous Effluvia, (or indeed by any other Effluvia which is very fine and volatile, as all other Effluvia which are more denſe, and received into the Body, will be attracted by the more denſe Particles of the Fluids) they can never be reſtored again to their former Elaſticity and attractive Force; and conſequently can never attract theſe volatile Effluvia as before; but when the Perſon receives any of this volatile Matter into his Body, for want of theſe active Particles to attract it, retain it, and, by its firſt diſſolving their Subſtance, to forward its Operation, it will be attracted and retained by the more denſe Particles of the Fluids, and very ſoon be enveloped in a viſcid Subſtance, which will ſoon deſtroy its Force and render it inactive. But when the Effluvia is more denſe, and conſequently contains a greater Quantity of Matter in its Particles, and is received into the Body, its Particles cannot be entirely rendered inactive by the oily and viſcid Particles of the Fluids, although they envelop them, but they will ſoon begin to exert their Force by cauſing an inteſtine Conflict in the Particles with which they are ſurrrounded, which muſt ſoon followed with their Diſſolution; and afterward with the Diſſolution of the adjacent Particles, and ſo on, till the whole Maſs is diſſolved. Of ſuch a nature is the Effluvia which ariſe from putrid Bodies, Jails, &c. and the Effects of it will be putrid Fevers, and a Diſſolution of the Maſs of Fluids.

PROP. II.

To define the Effects, or Symptoms, of this Diſeaſe in the human Body.

We have already obſerved, that the Effects of this Diſeaſe will be different in different Conſtitutions, *i. e.* according to the Strength of the Fibres, and the Denſity of the Blood: Therefore to give as clear a Definition of the Diſeaſe, and its Effects, as poſſible, it will be requiſite for us to point out the Effects of this Cauſe, according to the various Conſtitutions in which it happens.

AND, firſt, when the variolous Effluvia is received into the Body of a Perſon, whoſe Fibres are ſtrong and elaſtic, and whoſe Blood is of a good Texture; he will very ſoon find himſelf oppreſſed with a Senſe of Wearineſs and Indolence, without being able to diſcover any apparent Cauſe, to which he may attribute this Unneaſineſs: Soon after he finds himſelf ſeized with a Shivering and Coldneſs, which are ſucceeded with a violent Heat and Fever, and theſe attended with a Nauſea and Vomiting, a violent Pain in the Back and Loins, ſometimes in the Head and about the Region of the Heart, which ſome Authors call the Scorbiculum Cordis: His Pulſe is rapid, full, and tenſe; his Breathing hot, ſhort, and laborious; his Fever increaſes; his Urine becomes high-coloured; his Thirſt is ſometimes very great; his Sleeps are ſhort, and attended with Startings; he has a great Pain and Heavineſs of the Eye-lids, and will frequently let fall involuntary Tears. Children are generally ſeized with convulſive Motions or epileptic Fits. Adults will ſometimes be inclinable to ſweat, which will retard the Eruption of the Puſtules, and at other Times, without great Care, an Inflammation will be generated about the Throat, or other Parts of the Body.

ABOUT the ſecond or third Day, oftentimes ſooner, the Small-Pox will appear in the Skin, which will generally be of the regular or diſtinct kind, nay always, except the Patient has been improperly managed; and ſoon after the feveriſh

Symptoms will abate. About the ſixth or ſeventh Day, other little red Spots will appear between the growing Puſtules, and the ſick Perſon will become more reſtleſs. About the eighth Day, or ſometimes not before the ninth Day, the Puſtules will be at their State, and the Matter in them will be well concocted. The Patient now begins to be reſtleſs and feveriſh; from ſome of the variolous Matter being re-abſorbed by the refluent Blood, and renewing again the former Symptoms: But, by a gentle Diaphoretic and Anodyne, theſe Symptoms will abate, and the Small Pox gradually dry off. Theſe are the Symptoms of this Diſeaſe, when it attacks a Perſon of a good Conſtitution, *i. e.* when the Fibres of the Body are ſtrong and elaſtic, and the Blood of a proper Denſity; with a due Equilibrium between the Contractions of the Solids, and the Reſiſtance of the Fluids. But when the Quantity of the Blood is ſo much as to deſtroy this Equilibrium, and, by its Load, weaken the Contractions of the Fibres; or when the Atmoſphere is very hot, and conſequently the Blood tending naturally to an inflammatory State; then we are not to expect the former mild Symptoms, but others which are more ſtrong, the Conſequence of an inflammatory Blood; as a great Fever, Phrenzy, and frequently a Peripneumonic Inflammation; and in proportion to the Violence of thoſe Symptoms will the Number of the Puſtules be more or leſs, *i. e.* will their Tendency to the confluent kind, and the Diſſolution of the Blood-Globules be more or leſs.

BUT, when the variolous Effluvia enter the Body of a Perſon whoſe Fibres are naturally weak, or their Elaſticity has been much weakened by a former Diſeaſe, or the irregular Uſe of the Non-Naturals; and whoſe Blood is looſe and eaſily diſſolved; or impregnated with a large Quantity of ſaline and active Particles; we muſt not expect the ſame Symptoms or Effects from the variolous Effluvia, as we have obſerved before, although the Heat of the Atmoſphere is the ſame, and the Effluvia which enters both the Bodies is the ſame, both in Quantity and Quality; as the former Conſtitution greatly retarded its Operation, but this will be found to promote it.

THE Effects of this Effluvia received into a Body, whoſe Conſtitution is like that we have laſt deſcribed, will be found to be nearly as follows; except the Air is very hot or light; if ſo, they will be much increaſed.

The Patient will, in the firſt place, be attacked with all the Symptoms of the diſtinct kind, but they will be more violent, except the Fever, which will not be altogether ſo ſtrong as in the other Species; the Vomiting and Nauſea will be much more violent, as will likewiſe the Pain of the Head, and very often be attended with a Bleeding at the Noſe; the Pain of the Back and Loins will be now very violent, and the Reſtleſſneſs very great, with frequent Faintings and Anxiety. In Children a violent Diarrhœa attends the Diſeaſe throughout, and in Adults a Ptyaliſmus, and very ſeldom a Diarrhœa.—About the third Day, or ſometimes not before the fourth or fifth Day, the Puſtules at firſt appear like an Eryſipelas, or the Eruption of the Meaſles, and oftentimes purple or livid Spots likewiſe appear, filling up the

Space between them: but notwithſtanding the Fever and other Symptoms are a little abated upon the Eruption of the Puſtules and Spots; yet they continue for the moſt part till the ſecondary Fever, and are very often attended with great Reſtleſſneſs and Anxiety. The Puſtules in this Species do not riſe and fill as in the other Sort, neither do they ſuppurate kindly, but are generally depreſſed, flat, and run one into another, and ſo cover almoſt the whole Surface of the Body, whereby they are commonly called the Confluent Kind: The Swelling of the Face, and other Parts of the Body, is now very great: on the ſeventh or eighth Day, the watry Matter, with which they are filled, begins to be ſomewhat congealed, and looks white; and inclines to Maturation for the four or five ſucceeding Days, till at laſt it begins to grow yellow, and ſometimes black:

The external Parts often mortify; eſpecially when the Symptoms have been very ſevere and the Diſſolution of the Blood and Juices has been very great.

A Ptyaliſmus begins about the ſeventh or eighth Day, frequently ſooner, with a great Swelling of the Face, and other Parts of the Body.—About the eighth or ninth Day of the Diſeaſe, ſometimes not before the tenth or eleventh Day, a Train of feveriſh Symptoms will ariſe, and continue till the Eruptions begin to dry away; nay, oftentimes till they are all dried off. This is cauſed by the putrid Matter being re-abſorbed into the Blood, where it again begins to renew the former Symptoms, as we have obſerved before. The Puſtules being dried into Scabs, about the ſixteenth or ſeventeenth Day, begin to fall off; but when the Matter has not ſuppurated kindly; when the Surface of the Body turns livid: when the Eruptions do not riſe very high, and the Patient is languid; we ſhall always find that the Diſeaſe will continue even to the twenty-fifth or thirtieth Day; and the ſick Perſon will be afflicted either with a Coma or Delirium.

When the Air is very hot and light, or hot and moiſt, all theſe Symptoms will be much increaſed, as we have hinted before; but when the Air is cold and denſe, all theſe Symptoms will be much decreaſed, and the Patient will have a greater Chance for his Life. A hot and moiſt Atmoſphere greatly relaxes the Fibres of the Body, congeals the Fluids in the capillary Veſſels, retards the glandular Secretions, and rarefies the Blood; which makes ſuch a Conſtitution of the Atmoſphere

ſphere very prejudicial to all Kinds of Fevers, but more eſpecially to the Small-Pox.

PROP. III.

To point out the natural Termination of this Diſeaſe.

THIS Diſeaſe, like all other Diſeaſes, muſt terminate either in Life, Death, or another Diſeaſe. Therefore, according as the Blood is more or leſs diſſolved, and according to the Strength of the Fibres, will the Diſeaſe be known to be more or leſs violent, and its Termination to be in Life, Death, or another Diſeaſe. Now the Blood may be known to be more or leſs diſſolved, and the Fibres more or leſs elaſtic, by the following antecedent Cauſes, and their immediate Effects.

First, then, when the Air has been, for ſome time before, dry and heavy; when the Patient has lived very regular, with regard to theNon-naturals, and appears to be very healthy and alert; when the Eruptions are diſtinct and regular; when there is no Appearance of a Delirium or Coma, and the Symptoms are mild; when, in the confluent Kind, the Puſtules break out about the third Day, and ſoon after the Symptoms abate, and about the State they maturate kindly; when the Ptyaliſmus is free and regular, and the Diſeaſe not accompanied with a Delirium, Coma, or any of the violent Symptoms: Theſe Appearances denote the Diſeaſe will naturally terminate in Health.

Secondly, when the Atmoſphere is very light and moiſt, and has been ſo for ſome time, or very hot; when the Patient has lived very irregular, with regard to the Non-naturals, and leads a very debauched Courſe of Life; when the Fibres of the Body have been relaxed or weakened in their Springs by ſome former Diſeaſe, or the Patient's Fluids are replete with ſaline and active Bodies; when the firſt Symptoms of the Diſeaſe are very ſevere, as the Vomiting, Pain of the Head, or Loins, and Fever, and theſe attended with a Delirium; when the Puſtules appear on the firſt or ſecond Day, and appear like an Eryſipelas and cluſter together, looking very red and angry; when purple or livid Petechiæ appear in the Skin, and the ſick Perſon evacuates bloody Urine, or bleeds very much through the Noſtrils, or any other Part of the Body, and a violent Diarrhœa attends; when about the eighth or ninth Day, being the ſuppurating State, the Symptoms of the firſt State do not diſappear, more eſpecially the Fever and Delirium, but, on the contrary, continue to increaſe; when the Head and Face ſwell to a greater Degree than they generally do in theſe Caſes, are covered with a larger Quantity of Puſtules than ordinary, and are accompanied with a Delirium, or violent Pulſation of the Carotids; when the Puſtules fill with a clear ſharp Serum, are like Water Bladders, and do not maturate kindly; when at any Time of the Diſeaſe the Spitting ſtops, and cannot be raiſed again by Art; when the Spaces between the Puſtules, and about their Baſis, are pale or livid, and the Puſtules of a dark or livid Colour, and fill with an Ichor and Matter like clotted Blood; when the ſick Perſon purges a black fœtid Ichor, or a Blood Matter, or diſcharges black or very fœtid Urine; when in either Species he is delirious, and a Phrenitis follows; when the Swellings of the Face, Hands, and other Parts of the Body, ſuddenly fall, and a Quincy, Peripneumony, Pleuriſy, or Delirium, comes on; when about the fourth or fifth Day after the Eruption, a Delirium comes on, which will generally be preceded by a violent Pain in the Head, ſparkling and fixing of the Eyes, continual Watchings, and the Patient picks the Bed Clothes, or catches at imaginary Flies; and when the ſecondary Fever is attended with a Delirium or Coma, which cannot be removed by Art: All theſe Appearances denote the Diſeaſe will naturally terminate in Death.

THIRDLY, When the Symptoms of the Diſeaſe have been very violent, and Nature has not ſufficient Strength to force off all the morbid Matter; or when the Patient is naturally of weak Fibres, or has rendered them ſo by a debauched Courſe of Life, ſo that they have not a ſufficient Degree of Elaſticity to force off the variolous Matter quite from the Body, but let it fall on the extreme Parts: either of theſe may give Riſe to another Diſeaſe, according to the Part of the Body this variolous Matter is forced on; and ſo this Diſeaſe may be ſaid to terminate in another Diſeaſe.

PROP. IV.

To find out a Method for preventing this Diſeaſe; and when it has attacked the Patient, to carry it off entirely as an inflammatory Fever, without any Eruptions at all.

THE ſubject of this Propoſition is ſuch, as will undoubtedly make ſome People think me much miſtaken in my notions, or a Perſon who would introduce a Practice which would be for the Deſtruction of Mankind: But before thoſe People begin to ridicule me for differing from their Sentiments, let me adviſe them to examine them carefully, and take care to prove them to be right and juſt; then, if they find mine differ from them, they may ridicule me as much as they pleaſe.

In endeavouring to reſolve this Propoſition, we ſhall carefully obſerve not to proceed farther than the Laws of Nature dictate; (for, by theſe Laws, this, and all other Diſeaſes incident to the human Body, are produced, and muſt be cured;) and even confine our Practice to thoſe which we have had carefully confirmed by Experience, and the Authority of ſome of the greateſt Practitioners of the Age.

To point out a Method for preventing this Diſeaſe, is to preſcribe a Method for the Patient to live regular, with regard to the Non-Naturals, and to endeavour, as much as poſſible, to keep his Fibres properly braced, and his Fluids of a due Conſiſtence; to breath an Air which is free and clear, and to keep a juſt Equilibrium between the Contractions of the Fibres, and the Reſiſtance of the Fluids. Theſe Effects attended to will certainly prevent the Small-Pox: and the Manner of attaining them, we ſhall adviſe as follows.

1. THAT the Patient chuſe a Place for his Abode where the Air is fine and clear, and not too near any great populous Town. 2. That he uſe a Regimen of White Meats, or Meats which have not been long in Salt; and of theſe, with Vegetables, and Vegetable Food, he ſhould make his Dinner, drinking with them Small Beer, Cyder, or Water; and if he has been accuſtomed to drink Wines, he ſhould now drink a few Glaſſes of genuine Madeira, or the ſtrong Wines of Turkey or Greece diluted. His Supper and Breakfaſt ſhould be of Milk and Bread, carefully avoiding all

other Kinds of Aliment: Likewiſe, at Dinner, he ſhould carefully avoid all high ſeaſoned Food, Meats of hard Digeſtion, Pickles, and tartareous Wines, and uſe as much Sallad Herbs, and moderately ripe Fruits, as he pleaſes. 3. He ſhould go to bed before ten o'Clock, and riſe early, uſe ſome Exerciſe, as Riding, Walking, or in ſhort any gentle Exerciſe, and carefully avoid all violent Paſſions of the Mind. 4. If at any Time he takes cold, or has his Perſpiration obſtructed, he ſhould immediately take ſome Method to carry it off, either by Stool, Urine, or by the cuticular Glands; leſt the Equilibrium between the Solids and Fluids be broken, and a Diſeaſe enſue. 5. When ever the Air is light and full of Vapours, we would adviſe him to take ſome gentle Cathartic; as ſuch a Conſtitution of the Air will always decreaſe Perſpiration, by relaxing the capillary Veſſels, and conſequently an increaſed Quantity of the Fluids muſt ſoon follow; which will end in a Diſeaſe. 6. If the Small-Pox become epidemical in his Neighbourhood, he ſhould never change his Air, as is very cuſtomary in theſe Caſes, neither ſhould he be too free in going into Places where they are; and be very careful during that Time not to uſe any violent Exerciſe, or, in ſhort, do any thing which may too much rarefy, or inflame his Blood, or weaken its Texture. And any Perſon, who obſerves theſe Rules, may be aſſured he will not be hurt with the Small-Pox; for if ever he ſhould receive the Infection, its Effects will be trifling, and ſcarce worth minding; ſometimes no viſible Effects will follow, but the Diſeaſe will paſs off unobſerved, as we have hinted before.

As we have pointed out a Method to preſerve the Body from any ill Effects of the variolous Effluvia, we muſt now proceed to point out the Method we have propoſed for carrying off the Effects of this Effluvia, as an inflammatory Fever, and without any Eruptions at all. But we muſt previouſly obſerve, that this Method muſt be purſued before any Signs of the Eruptions appear, *i. e.* before the Texture of the Blood is diſſolved, and the Matter ſeparated from it. This Method was firſt practiſed by the great *Boerhaave*, and ſince by moſt of the Phyſicians of *Holland* and *Germany*, and by a great many of our own Countrymen; and may be performed as follows.

As ſoon as the Patient is ſeized with the firſt Symptoms of the Small-Pox, in the firſt Day of the contagious Inflammatory

State, or the Beginning of the ſecond Day, if no Eruptions appear, Bleeding ſhould be immediately performed, to ſuch a Quantity as his Conſtitution will admit of, and according to the Violence of the Symptoms and Strength of the Pulſe, which ſhould be our Guide in theſe Caſes. Bleeding ſhould be repeated if the Symptoms indicate it; and at the ſame Time the Patient ſhould drink large Quantities of thin, diluting, ſubacid Drinks, in which ſhould be given occaſionally ſome few Grains of Salt Nitre; and at proper Intervals of Time, let him take *Antimonii Diaphoretic. Bezoar. Min.* or *Nitrum ſtibiatum*, in Doſes proportionable to his Age, and Strength of Conſtitution; which muſt be left to the Judgment of the Phyſician. During the Uſe of theſe Medicines let an emollient Clyſter be injected once every twelve Hours or once every Day, according to the Violence of the Symptoms, and at the ſame Time let the external Parts of his Body be well fomented with an emollient Fomentation; and let this be repeated two or three Times every Day. The Diet during this Courſe of Medicine ſhould be thin, cooling, and ſomewhat abſorbing. The Patient ſhould be kept in ſuch a Degree of Heat as will encourage a free Perſpiration, but not a violent Sweat, as that would be very prejudicial in theſe Caſes, for two Reaſons. Firſt, becauſe it will greatly weaken the Strength of the Patient, and ſecondly, becauſe it robs the Blood of its moſt fine Particles. If the Air is very hot at this time, it will be neceſſary that one Part of the Window of the Patient's Room be left open, to let in the freſh Air, but not ſo much as to check his Perſpiration.

By the Uſe of this Method will the Rarefaction of the Blood be taken off, the violent Tenſion of the Fibres, the Conſequence thereof, be removed, and the active Particles of the variolous Effluvia, which are joined to the active Particles of the Blood, be either abſorbed or carried off by the increaſed Excretions; whereby the inteſtine Motion of the Blood, and the Train of Symptoms which are the Conſequence thereof will be entirely removed; or at leaſt ſo much abated, that the Eruptions will be ſcarcely perceived. For, in this Diſeaſe, it will always be obſerved, that in Proportion to the Rarefaction of the Blood, and the Quantity of the active Particles contained therein, will the Symptoms be more or leſs violent, and the Eruptions be more or leſs numerous, and conſequently the ſick Perſon will be in greater or leſs Danger. So that when the Rarefaction of the Blood is removed, and the active Particles of the variolous Matter is abſorbed, the Number of Puſtules muſt be very trifling, if there are any, and the Patient will be free from Danger.

A GREAT many Phyſicians of Character, and others who are their Followers, have objected to this Method of treating the Small-Pox; becauſe, ſay they, the whole Maſs of Fluids are impregnated with the variolous Effluvia; and conſequently the Effects thereof cannot be deſtroyed, except we take off the whole Maſs of Blood, or entirely deſtroy its Activity by ſome grand Specific: But this way of Reaſoning is abſurd; for it is well known, that the aforeſaid Method, which we have propoſed, will not only allay the

Rarefaction of the Blood, ſoften and relax the Fibres, and abſorb the active Particles of the variolous Effluvia, but, by its increaſing the Quantity of the glandular Secretions, the active Particles, which are already generated in the Fluids, be forced off through the Pores of the Skin; and conſequently, when the Texture of the Blood-Globules is ſtrong, and the Fibres have a proper Degree of Elaſticity, ſo that the former are not eaſily diſſolved with the variolous Matter, and the latter have a ſufficient Degree of Strength to throw off theſe active Particles, by giving the Fluids a proper Degree of Motion, the Diſeaſe may be entirely carried off without the Patient having any Eruptions. But, on the other Hand, when the Blood is naturally of a weak Texture, and the Veſſels ſomewhat relaxed, this Method will not carry off the Diſeaſe entirely, without ſome Eruptions; and in Proportion to the Quantity of the Blood-Globules which are diſſolved, will the Quantity of the Eruptions be.

When the variolous Effluvia has impregnated the Blood for ſome Time, and the Texture of its Globules is diſſolved (which may be known by the Eruptions appearing in the Skin) this Method ſhould be forborn, as it will always be attended with dangerous Conſequences, and ſuch Methods of Cure ſhould be purſued as we ſhall point out in the following Propoſition. Or, if the Phyſician, or Patient, do not approve of this, they may purſue the following Methods of Cure from the Beginning.

PROP. V.

To point out the general Methods of Cure of the Small-Pox, in all its Stages; and according to the Nature of the Conſtitution in which it happens, and as the Atmoſphere is more or leſs hot or heavy.

In the Cure of this Diſeaſe, a particular Regard muſt always be had to the Strength and Elaſticity of the Patient's Fibres, the Denſity of his Fluids, and the Conſtitution of the Atmoſphere; upon which our Succeſs will always depend.

For, in the firſt Place, when the Patient is of very ſtrong Fibres, and his Blood of a good Conſiſtence, ſuch a Perſon, when attacked with the Small-Pox, will always have a ſmart Fever at the Attack; more eſpecially if the Air is very light and hot. Therefore, if the Patient calls Aſſiſtance immediately after the Attack, it will be neceſſary to bleed, and, if there is occaſion, repeat it: For Bleeding, in theſe Caſes, will not retard the Eruption of the Puſtules, as ſome have imagined; but, on the contrary, will greatly promote them. For when the Velocity of the Blood is very much increaſed, the Contractions of the Muſcles will be ſo likewiſe; and both theſe being increaſed, the glandular Secretions will be greatly diminiſhed; and conſequently the variolous Matter cannot be ſeparated from the Maſs of Blood, ſo as to be protruded to the Surface of the Body. But, after Bleeding, the Velocity of the Blood will be greatly diminiſhed, and the muſcular Contraction decreaſed, by which the glandular Secretions will be greatly increaſed, and the variolous Matter, by the expulſive Force of the Circulation, be protruded to the Surface of the Body.---When the variolous Effluvia enter the Body of ſuch a Perſon, and the Air at the ſame time is cold and heavy, it will be Needleſs to bleed, except the Patient has lived too free, for ſome Time before; as the Fever will not be very great, and the Small-Pox will generally be of the diſtinct Kind. In theſe Caſes, keeping the Sick Perſon in a moderate Degree of Warmth, not too hot, nor too cold, and adminiſtring Plenty of thin, diluting, ſubacid Liquors, with a few Grains of Nitre and the abſorbent Powders, will be found to allay the Symptoms, and promote the Expulſion of the variolous Matter. In either of theſe Caſes, when the Fibres of the Body are too much contracted, an emollient Fomentation, or, according to Dr. HUXHAM, emollient Cataplaſms applied to the extreme Parts of the Body, will be found to be attended with great Succeſs; by relaxing their Fibres, and conſequently making a Revulſion of the variolous Matter into thoſe Parts: nay, we have ſeen this Method attended with great Succeſs, for ſome Days after the Eruptions have appeared, when they have not filled kindly.

But, when the Patient is of a very weak Conſtitution, *i. e.* when the Fibres of his Body are lax, and his Fluids eaſily ſeparable, the foregoing Method ſhould be omitted, and the following purſued. If the Air is hot and light when the variolous Effluvia enter the Body of ſuch a Perſon, their Effects will be very violent; the Blood-Globules will be ſoon diſſolved, by the inteſtine Motion raiſed in their contained Particles; and, the Fibres being relaxed, the broken Maſs will be forced into the lymphatic Veſſels; and this with ſuch Violence as very often to make a rupture in thoſe Veſſels, and give Riſe to an Hæmorrhage. Therefore, in theſe Caſes, we muſt firſt endeavour to diminiſh the Quantity, and abſorb the acrid, ſtimulating, and diſſolving Quality of the variolous Matter. And, ſecondly, to ſtrengthen the Texture of the Maſs of Blood ſo as to enable it to protrude this variolous Matter to the Surface of the Body. Theſe two Intentions are anſwered by the following Method. If the Body is very full of groſs Humours, and the Diſſolution of the Blood-Globules appears to be very great, immediately adminiſter a gentle Emetic, and ſoon after Medicines of the following kind.

℞ *Bezoar. min.* ʒj; *Sal. Nitri gutt.* xv; *Conſ. Cynoſb. q. ſ. M. f. bol. quarta quaque hora ſumend. ſuperbibend. hauſt. ſeq.*

℞ *Aq. Alex. ſimpl.* ℥ij; *Extract. Cort. Peruv.* ʒj; *Sp. Vitrioli gutt.* xx; *Syr. Cort. Aurant.* ʒiij; *M. f. hauſt.*

In the Intervals of Time between the Uſe of theſe Medicines, the Patient ſhould drink freely of thin, diluting, ſubacid Liquors, and be nouriſhed with Panada, Chicken Broth, light Pudding, &c. and carefully avoid Heating himſelf too much, in Bed or up.

It will be neceſſary for the Patient, in theſe Caſes, to have the freſh Air as much as poſſible, as we have obſerved before, in the diſtinct Kind; and if his Body is bound, it will be right for us to inject a gentle Clyſter; but great Care muſt be taken not to bring on a Diarrhœa, which will always be attended with Danger, except it is critical, or Nature is loaded with a ſuperabundant Quantity of crude Humours.

If the Eruptions come out in too great a Quantity on the Breaſt, Neck, Head, or any of the vital Parts, it will be neceſſary for a Revulſion to be made, to endeavour to draw the variolous Matter more to the extreme Parts: To anſwer which, emollient Fomentations, or Cataplaſms will be found very beneficial.

When the Air is more cold and heavy, the Effects of this Effluvia will not be ſo great as in the Species juſt now deſcribed, and the preceding Medicines ſhould not be adminiſtred too often; once every ſix Hours will be ſufficient; and ſometimes the Nitre ſhould be omitted, *i. e.* when the Patient has not a ſufficient Degree of a Fever to protrude the variolous Matter to the Surface of the Body; and in the Room thereof ſhould be ordered the ſame Quantity of the Powder of Contrayerva Root. In theſe Caſes, great Care ſhould be taken to keep the Bowels eaſy and free; for when they are loaded and conſtipated, the Fever will be greatly increaſed, and, without great Care is taken, a Delirium will be brought on: and, on the other Hand, when they are too looſe, a Diarrhœa will be the Conſequence; which will not only much retard the Eruption of the Puſtules, but, when the Texture of the Fluids is greatly diſſolved, a Diarrhœa will, for the moſt Part, be ſucceeded by a Dyſentery.

When the Eruptions are come out, we muſt endeavour to preſerve the Fluids in an equal State, till the State of Maturation comes on; for which it will be neceſſary, in both Species, to anſwer two Intentions. Firſt, to keep the circulating Fluids in ſuch an equal State, as is neceſſary for the regular Expulſion of the remaining variolous Matter. And ſecondly, to preſerve the Texture of the whole Maſs, and the Vibrations of the Fibres. Therefore, to anſwer the firſt Intention, when the Conſtitution is good, and the Eruptions of the diſtinct Kind, after they are all out, the Sick will be very calm and eaſy, and need no other Aſſiſtance than what may be had from a good Nurſe, till the State of Maturation. But when the Conſtitution is much broken or very weak, or the Air very hot, or the Fever has run very high, the Eruptions running one into another, and the Symptoms not abating upon their Appearance; we muſt be very careful in the Management of the Patient, and ſtill continue on the former Courſe of Medicines. The *Cort. Peruv. cum C. Citri* will be found excellent here; but great Care muſt be taken to keep the

Bowels free and eaſy, as we have juſt now obſerved. When the Puſtules do not fill regularly, give, every ſix or eight Hours, half a Drachm of Bezoar Mineral. Very often about the fifth or ſixth Day of the Diſeaſe, the ſick Perſon will begin to be very reſtleſs, and have a Cough, cauſed by a large Diſcharge of acrid Humours through the Salival Glands, which, without great Care, will fall down on the Bronchia, irritate its Fibres, and give riſe to theſe Symptoms. In theſe Caſes, we know of no better Medicine than *Elix. Paregoric.* given in a Draught of the common Pectoral Decoction, in Doſes proportionable to the Strength of the Patient, and the Violence of the Diſeaſe; and at proper Intervals. This is certainly the beſt opiate that can be now given, as the Opium, being guarded with Camphire, will not produce that great Relaxation, and univerſal Debility, which it is known to produce at other Times; and certainly will always be found excellent in theſe Caſes: For there is no Medicine yet known, which will incraſſate thin acrid Humours, abate their Irritation, and maturate the Puſtules, ſo effectually as this Drug, properly adminiſtered; how it produces theſe ſalutary Effects we have plainly proved before. When the Salivation is very little, and that viſcid, and the Breathing very difficult and laborious, we muſt be cautious in adminiſtering Opiates, except in ſmall Doſes, and joined with *Sal. Succin. Gum. Ammoniac.* &c. then they may be uſed to great Advantage; and certainly, towards the State of the Diſeaſe, there is no doing any thing without them. When the Patient is much depreſſed, and the Eruptions full of Lympha, or what is commonly called the cryſtalline Pox, we may apply Bliſters, as the Symptoms indicate, more eſpecially if they are attended with a Coma or Delirium; but great Care muſt be taken not to apply any Bliſter, when there are any Signs of the Blood's being much diſſolved, *i. e.* when the Eruptions are ſmall and black, with Petechiæ, bloody Urine, and Hæmorrhages; for they will always be attended with ill Conſequences, and very often with the Death of the Patient.

About the ſeventh or eighth Day, in the diſtinct Kind, and the eleventh Day, in the confluent Kind, the ſtationary Period of the Diſeaſe comes on, which will be very ſoon ſucceeded by a Train of violent Symptoms; in the confluent Kind the ſick Perſon will be always in imminent Danger at this Time, and very often ſubmits to Death: The

Swellings of the Face, Hands, and other Parts of the Body, now ſink at once, the Salivation ſuddenly ceaſes, the Puſtules grow flaccid, and pit in the middle, the Interſtices pale, ſometimes aſh-coloured or black; a Rigour comes on, which will be very ſoon ſucceeded by a high Fever, Difficulty of Breathing, Faintneſs, Anxiety, Tremors, and ſometimes a Delirium. In theſe Caſes Authors have adviſed bleeding and bliſtering; but certainly theſe will generally be attended with bad Conſequences, and often with Death. As the Cauſe of theſe Symptoms is nothing more than ſome of the variolous Matter being re-abſorbed by the refluent Blood, and mixed with the whole Maſs, the former Train of Symptoms will be again excited; but will now be much ſtronger than in the firſt Stage of the Diſeaſe, becauſe the cuticular Pores are very much obſtructed; conſequently the volatile Particles, generated by the Diſſolution, and violent Attrition of the Fluids, will not have Room to fly off through theſe Pores, but muſt be longer retained in the Blood, and paſs off by Urine, or Stool; and likewiſe the Body is now much weaker, and the Fibres not able to give the proper Reſiſtance to the Fluids, to prevent their Diſſolution and Putrefaction. Therefore, in theſe Caſes, Bleeding muſt be very prejudicial, except the Patient was not let Blood in the Beginning, and the Fever runs very high; but Bliſtering will always be attended with bad Conſequences, and ſhould never be uſed here. The only Method of relieving theſe Symptoms is by Diuretics, Diaphoretics, Anodynes, and Cathartics; to which ſhould be added the *Cort. Peruv.* and theſe ſhould be adminiſtered occaſionally, as the Symptoms indicate;

cate; or ſuch a Method as the following will be found generally ſucceſsful.

℞ *Pulv. Rhab. opt. Sal. Diuretic. aa.* ℈j; *Elect. Lenitiv.* ℥ſs; *Syr. Balſ. q. ſ. M. f. Bol. Cathartic.*

This ſhould be taken immediately after the Symptoms of the ſecondary Fever appear, to cleanſe the *Primæ Viæ*, and carry off ſome of the putrid Humours, which will now be forced thereon. This will be done without exaſperating any of the feveriſh Symptoms, but, on the contrary, ſoon after the Operation of the Cathartic, they will be found to be ſomewhat abated. Immediately, after the Uſe of this, order Medicines of the following Kind; and, if there is Occaſion, at two or three Days End, repeat the Cathartic, and ſo on till the Symptoms diſappear.

℞ *Bezoar. min.* ʒſs; *Sal. Succin. gutt.* vij; *Conſ. fruc. Cynoſb. q. ſ. M. f. Bol. quarta quaque Hora ſumend. ſuperbibend. hauſt. ſeq.*

℞ *Decoct. Cort. Peruv.* ℥iſs; *Sal. Nitri gutt.* x; *Spt. vitrioli gutt.* x; *Syr. Cydon.* ℥ſs; *M. f. hauſt.*

During the Uſe of theſe the ſick Perſon ſhould drink freely of thin, diluting, ſubacid, and antiputreſcent Liquors; and every Evening, two or three Times a Day, or, as the Symptoms indicate, ſhould take the following Anodyne.

℞ *Aq. Alex. Simpl.* ℥iſs; *Tinct. Caſt. Ruſs.* ʒj; *Elix. Paregoric.* ʒiſs; *Syr. Papav. Errat.* ʒiij; *M. f. hauſt. anodyn.*

The Evening Doſe ſhould always be taken about five or ſix o'Clock, as the Symptoms will always be exaſperated towards Night; but by the timely Uſe of the Anodyne, they may be very much prevented. Had the Anodyne been uſeleſs in all the other Stages, and Symptoms of this Diſeaſe; yet the Pain and Unneaſineſs, which ariſe from the Puſtules, towards the ſtationary Period, would require its Uſe: For, when the Skin is inflamed and covered with Boils, the Pain and Unneaſineſs which ariſe from thence will be very great; and, without this Medicine, would bring on a Delirium. To Children we would adviſe ſmall Doſes of the ſame Elixir, and not *Diacodium*, as is frequently given; for here the Opium is guarded with Camphire, and other Ingredients, which greatly weaken its incraſſating and relaxing Quality; and, conſequently renders it leſs dangerous for ſtopping the Salivation, or any of the other Secretions. Very often, about the State of the Diſeaſe, the Salivation either ſtops, or abates very much, and the Matter grows very viſcid; ſoon after, the Patient is threatened with a Suffocation, has a great Difficulty of Breathing, Hoarſeneſs, and cannot ſpit off the thick viſcid Matter.

In theſe Caſes Opiates ſhould be ſparingly uſed, and the Patient ſhould take freely the following Gargaryſm.

℞ *Aq. Font.* ℔ſs; *Mel. Roſ. Acet. Commune, aa* ℥j; *Coq. Colaturæ* ℥vj; *adde Sal. Ammon.* ʒj; *M. f. Gargariſm.*

But when the Matter, which ſhould be ſpit off, is ſwallowed with the Aliments, and it cauſes a Nauſea or Vomiting; or, which is often the Caſe in Children, paſſes off with a Diarrhœa, and greatly weakens the Patient; we would always

adviſe

adviſe a gentle Emetic of *Ipecacoanha*, or *Oxymel Scilliticum*; for by this will the viſcid Matter be evacuated, the Stomach and Bowels relieved, and Expectoration and Reſpiration greatly eaſed.

This ſecondary Fever, when the Body has been much weakened by the Diſeaſe, will often return at ſtated Periods, and put on the Appearance of an intermitting Fever; ſometimes it will fall on the Lungs, and appear like a hectic Fever. In both theſe Caſes we would adviſe the Patient to be carried to a Place where the Air is clear and fine, and immediately to purſue a Courſe of Aſſes Milk, and the Uſe of Medicines of the following Kind.

When the Diſeaſe puts on the Appearance of an Intermittent:

℞ *Tinct. Sacra, infuſ. Sennæ, aa* ℥j; *Syr. de Spina Cer.* ʒiij; *M. f. Hauſt. Cathartic. ſemel in ſeptimanâ ſumend. ad tres vices; diebus intermediis capiat ſequent.*

℞ *Decoct. Cort. Peruv.* ℥iſs; *Extract. Gentian.* ʒſs; *Sal. Succin. gutt.* x; *Elix. Vitrioli Mynſichti gutt.* xij; *Syr. Cort. Aurant.* ʒiij; *M. f. hauſt. ter in die ſumend. ſuperbibend. hauſt. theæ ſalviæ.*

But when the Diſeaſe puts on the Appearance of an Hectic,

℞ *Mannæ opt.* ℥j; *Juſcul. Avenac.* ℥ij; *M. Deinde adde Pulv. Rhub. opt. Sal. Diuretic. aa.* ℈j; *M. f. Hauſt. Cathartic. Capiat ut prius.*

℞ *Balſ. Tolu, (in vitel. ov. ſol.)* ʒſs; *Aq. Menth. ſimpl.* ℥iſs; *Sal. Diuretic* ℈j; *Syr. Balſ.* ʒiij; *M. f. Hauſt. ter in die ſumend.*

℞ *Decoct. Cort. Peruv.* ℥vj; *Extract. Gentian.* ʒij; *Sal. ſuccin.* ʒj; *Syr. Cort. Aurant.* ℥j; *M. f. Mixtura. Capiat Cochl.* iv. *hora undecima mat. & quarta pomeridiana.*

The Diet, during this Courſe of Medicine, ſhould be very nutritious, and the Patient ſhould uſe gentle Exerciſe as his Strength will bear.

CHAP.

CHAP. XII.

Of a PLEURISY.

PROP. I.

To define the Nature and Cauſe of this Diſeaſe.

A PLEURISY may be ſaid to be preſent, when the Patient is afflicted with an acute Pain on either Side of the Breaſt, attended with a violent Fever, and a hard quick Pulſe, which are much increaſed by the Preſſure of the Air upon the Lungs, when it is drawn in hard, and decreaſed when the Air is forced out, or when the Patient performs Breathing without moving the Cheſt: He coughs moſt inceſſantly, which, becauſe of the violent Pain it cauſes, he ſtrives to ſuppreſs.

THIS Diſeaſe owns for its antecedent Cauſes, whatever cauſes too great a Rarefaction of the Blood-Globules, and too violent a Contraction of Fibres, chiefly thoſe which compoſe the intercoſtal Muſcles, the Pleura, and the Perioſteum of the Ribs. And theſe are, firſt, a ſtrong plethoric Conſtitution, whoſe Blood is naturally very denſe, and whoſe Fibres are very elaſtic. 2. Drinking too great a Quantity of Spirituous or vinous Liquors, which greatly increaſe the Contraction of the Fibres, and the Rarefaction of the Blood-Globules. 3. Uſing violent Exerciſe in a cold denſe Air; for by the great Preſſure of the cold denſe Air will the Fibres of the Body be greatly contracted; and, by the increaſed Velocity, which the Fluids receive from the violent Exerciſe, will their Attrition be increaſed, their aerial Particles be greatly expanded, and conſequently their Globules greatly rarefied. 4. Expoſing the Body too much to the cold Air, eſpecially when the Atmoſphere is very heavy. By this the Fibres will be greatly contracted, the Perſpiration be obſtructed, and a violent Fever be generated; as we have pointed out in our Definition of an acute continual Fever. 5. When the Atmoſphere has been very hot and light for ſome Time, and then ſuddenly changes to be very cold and heavy; or, when the Atmoſphere has been very cold and heavy for ſome Time, and then ſuddenly changes to be very hot and light. When the firſt of theſe is the Caſe, the Fibres of the Body will be very much relaxed, and the Blood-Globules be much rarefied; but as the Pores are all open, and the Perſpiration very much, no ill Conſequences do attend ſuch a State of the Conſtitution; till on a ſudden the Air becomes cold and heavy, braces up the Fibres of the capillary Veſſels, ſtops the Pores, obſtructs

Perſpiration, and thereby increaſes the Quantity of the Blood; which, with its increaſed Rarefaction, and the Conſtriction of the capillary Veſſels, will give Riſe to this Fever and Inflammation. But when the ſecond is the Caſe, the Fibres of the Body will be greatly contracted, the Blood-Globules be more denſe and firm, the Diameters of the Pores be greatly decreaſed, and the Quantity of the perſpirable Matter will be greatly diminiſhed: but when on a ſudden the Air changes hot, and the Atmoſphere becomes very light, the Fluids will be rarefied by their being impregnated with the hot Air in the Lungs, before the Veſſels are relaxed in Proportion to their Rarefaction, and thoſe of the extreme Parts of the Body deobſtructed of their viſcid Contents; and conſequently an inflammatory Fever muſt ariſe from the too great Reſiſtance of the Veſſels upon their rarefied Contents.

WHEN either of theſe give Riſe to this Diſeaſe, we may call it an Idiopathic Diſeaſe, and it is for the moſt Part a genuine Pleuriſy. There is another Species of this Diſeaſe, which is commonly called a Baſtard Pleuriſy, and may take its Riſe from various other Cauſes, too tedious to mention.

THE immediate Cauſe of a genuine Pleuriſy is an Inflammation of the Pleura. For when, by the foregoing antecedent Cauſes, the Fibres of the Body are greatly contracted, the Blood-Globules much rarefied, the Perſpiration leſſened, and conſequently the Quantity of the Fluids increaſed; the Action of the Fibres upon the Fluids will be greatly increaſed, (as we have obſerved before) and conſequently the Velocity, Attrition, and Heat of the latter, will likewiſe be very much increaſed, and their Globules more rarefied, till, at length, they are rendered incapable of paſſing the ultimate Ramifications of the Arteries; their Diameters being now increaſed much above the Diameters of the minute Veſſels; and beſides this, the ſerous Part of the Fluids is now rendered much more denſe and viſcid: For this Part of the Fluid, when the Maſs is heated much above the natural Standard, will always be found to grow more denſe and viſcid, and to be of the Conſiſtence of the white of an Egg; which will not only diſpoſe to Inflammations in general, but particularly to this Diſeaſe, or a Peripneumony; for as the Arteries expanded on Membranous Parts are extremely ſmall, they are of courſe the moſt eaſily obſtructed by the viſcid tenacious Fluids, and conſequently the moſt ſubject to Inflammations. The ſpurious or baſtard Pleuriſy is an Inflammation of the intercoſtal Muſcles, or the Perioſteum of the Ribs, but I think it ſhould rather be called an inflammatory

Rheumatiſm. Yet, as its Effects, and Method of Cure, are ſomewhat like thoſe of a genuine Pleuriſy, we ſhall treat of it in this Chapter.

PROP. II.

To point out the Effects of this Diſeaſe.

IMMEDIATELY after the Pleura becomes inflamed, the Patient is attacked with a ſhivering, which is very ſoon ſucceeded by great Heats and Thirſt; a few Hours after (although ſometimes much later) he is taken with a violent pricking Pain in his Side, which ſometimes ſpreads itſelf towards the Shoulder Blades, towards the Spine, or towards the fore-parts of the Breaſt; he coughs frequently, and his Pulſe is very hard and quick: In the beginning he expectorates ſome Matter, but it is very little in Quantity, thin, and intermixed with Particles of Blood; afterward the Quantity of the expectorated Matter increaſes, is better digeſted, but ſtill mixed with ſome Blood. Sometimes the Quantity of the expectorated Matter does not increaſe, but that is always a bad Sign. He has a high Fever, which goes in equal Degrees with a Cough, ſpitting of Blood, and Pain; his Belly is for the moſt part bound, and his Urine always of a high Colour; he has a great Difficulty of Breathing, and cannot lye on his Side without very great Pain and Uneaſineſs.

Theſe are the Symptoms or Effects of a genuine Pleuriſy; the Effects of the ſpurious or baſtard Pleuriſy, we will deſcribe as follows.—The ſick Perſon is ſuddenly attacked with a pricking Pain in his Side, which ſometimes moves, and is not attended with a high Fever or Cough, but is much more mild than the former; the Patient is not in ſo much Pain, when he lies on the oppoſite Side, as when he lies on the Side affected, and does not expectorate any Blood.

PROP. III.

To point out the Termination of this Diſeaſe.

THIS Diſeaſe may terminate, as we have obſerved of all other Fevers, in Health, Death, or another Diſeaſe: Therefore, from the Violence of its Effects we may judge of the Violence of its immediate Cauſe, and from both its Termination. Firſt, then, when the Sick Perſon, immediately after the Attack, expectorates bloody Matter, or pure Blood, the Diſeaſe will be very acute, and he frequently ſubmits to Death. 2. When the Diſeaſe begins very gentle, and continues ſo till the ſixth or ſeventh Day, but afterward grows worſe, it is for the moſt part mortal. 3. A dry Pleuriſy, where there is no Expectoration, and where the Pains tend upwards, commonly ends in Death. 4. A Peripneumony following a Pleuriſy is always mortal. 5. When the ſick Perſon ſpits with a great Sound in his Breaſt, and ſeems to be caſt down; his Eyes ſuffuſed with Redneſs, and clouded; the Diſeaſe will always end in Death. 6. When the Diſeaſe happens in a Perſon of denſe ſtrong Fibres, and whoſe Blood is eaſily rarefied, and at any time of the Diſeaſe the Expectoration ſtops, and he begins to catch imaginary Flies, or pick the Bed Cloaths, Death will ſoon cloſe the Scene. But, on the other Hand, when the Patient expectorates freely and is eaſed thereby, without a Rheum at the Noſe, in a great Quantity at firſt, and like Matter, but ſoon changing into white, or before the fourth Day; and continues till the Symptoms are abated, or not being long ſuppreſſed, without returning as before; when there is a Diſcharge of viſcid grumous Blood by the hæmorrhoidal Veins; when the Patient diſcharges a large Quantity of thick turbid Urine, with a Strangury; when ichorous or purulent Impoſthumes or Tumours ſhew themſelves behind the Ears, or on the Legs, and ſuppurate kindly; when a great Quantity of yellow bilious Matter is diſcharged by Stool before the fourth or fifth Day, and the Symptoms abate thereby; when the Pain in the Side is removed to the Shoulder, Hand, Back, or any other remote Part, with a Numbneſs, Pain, and Heavineſs of the Part: All theſe Symptoms are ſalutary, and denote the Diſeaſe will terminate in Health.

THIS Diſeaſe may end in another Diſeaſe, as in an Empyema, or Conſumption; viz. when the Force of the Inflammation is overcome by Bleeding and other Medicines, yet the Sick Perſon, making no Diſcharge upward, cannot evacuate that purulent bloody Mucus which is forced on the Veſſels of the Bronchia, ſo that it increaſes in Quantity, and ſo generates an Empyema. Sometimes indeed there will be a Tranſlation of the viſcid tenaceous Matter on ſome of the remote Parts, which generates a Diſeaſe there, according to the Nature of the Part on which it is forced.

PROP. IV.

To point out the Method of Cure for each Species of this Diſeaſe, as far as Human Nature is capable of performing it.

As a Phyſician is Nature's Servant, he ſhould carefully obſerve all her Motions, and ſalutary Tendencies. Therefore, when, from the foregoing ſalutary Symptoms, we find that Nature is about to make a critical Diſcharge, we ſhould not endeavour to counter-act her in her Operations, but to aſſiſt her therein as much as poſſible. For inſtance, all violent Evacuations, Bleeding, &c. are now to be avoided, and the Patient to be kept as calm and quiet as poſſible. The air, if not naturally moiſt, and temperately warm, muſt be made ſo by Art; the Steam of hot Water wherein were boiled emollient Herbs, Roots, &c. ſhould be directed to his Lungs, Noſtrils, Mouth, Feet, and Legs; his Diet ſhould be very ſmall and thin; his Medicines of the cooling kind, ſuch as Emulſions, Ptiſans, and Pectorals, with *Sal Nitri*, and ſweetened with Honey: the pained Parts are to be fomented with emollient warm Decoctions, and afterward well rubbed, and ſtimulated with a volatile Liniment. Soft diuretic Clyſters with Turpentine are to be injected, and if the hæmorrhoidal Veins do not bleed, Leeches ſhould be immediately applied, and left to remain on till they have ſucked a large Quantity of that groſs viſcid Blood. Reſt ſhould be procured by gentle Paregorics, if it is not natural; as by the Elixir

Paregoric, which, in theſe Caſes, will be found excellent, and any Evacuation, which appears to be beneficial, ſhould be encouraged, and aſſiſted by Art. But when the foregoing ſalutary Symptoms are abſent, and Nature is oppreſſed, we muſt proceed to relieve her by Art; which may be attempted as follows.

The Patient is to be immediately blooded in the Arm, out of a large Orifice to ſixteen Ounces, or as his Strength, the Pulſe, and the Fever ſhall determine, or till the Pain abates; and to be repeated as often as the Symptoms return, or till the Blood begins to grow thin and looſe; then Bleeding is to be immediately avoided, although ſome Symptoms demand it; and the Cure is to be purſued with Medicines. After Bleeding, an emollient cooling Clyſter ſhould be immediately injected, more eſpecially if the Body is coſtive; as this will be found very beneficial for two Reaſons. Firſt, it empties the Bowels of groſs Excrements, Flatus, &c. Secondly, by emptying the Bowels, it takes off a great deal of their Preſſure on the deſcending Aorta and Iliacs, and conſequently a larger Quantity of Blood will deſcend through theſe Veſſels, and the ſuperior Parts be much eaſed thereby. Very ſoon after, the pained Part is to be fomented with a Fomentation made of emollient Herbs, Roots, and Seeds, boiled in Milk and Water; and immediately afterward to be anointed with the following Liniment.

℞ *Unguent. Sambuc. ex althæa aa* ℥j; *Liniment. vol.* ℥iij; *Liniment. ſaponac.* ℥iſs; *M. f. Liniment.*

THIS ſhould be done every three or four Hours; and, from the Beginning of the Diſeaſe, internal Medicines of the following Kind ſhould be adminiſtered.

℞ *Sperm. Ceti (in q. ſ. vitel. ov. ſol.)* ʒj; *Sal. Nitri,* ℈j; *Aq. Alex. ſimpl.* ℥ij; *Sp. Sal. Ammon. gtt.* xx; *Oxymel ſcillit.* ʒiij; *M. f. hauſt. quarta quaque hora ſumend. ſuperbibend. Decoct. Pectorale* ℥iv.

℞ *Decoct. Pectorale,* ℥iij; *Elix. Paregoric.* ʒiſs; *Ol. Lini. ſ. j. (in vitel. ov. ſol.)* ʒij; *Sp. Nitri Dul. gtt.* LX; *Syr. Papav. Errat.* ʒiij; *M. f. hauſt. omni nocte hora ſomni ſumend.*

During the Uſe of theſe, the ſick Perſon ſhould drink freely of thin diluting Liquors, ſuch as thin Whey, Water Gruel, a Decoction of Barley and red Poppies, thin Chicken Broths, Emulſions, or the like. When the Pain is violent, the foregoing Anodyne Draught, after repeated Bleedings, ſhould be repeated two or three Times a Day, or as the Caſe requires; and it will be found exellent in theſe Caſes, as Pain is a Stimulus, which greatly increaſes the Velocity of the Circulation, and the Heat of the Fluids, and will likewiſe increaſe their Quantity on the pained Part, which increaſes the Inflammation; ſo that from hence we may conclude that Opiates, prudently interpoſed with Bleedings, are of very great Service in all Pleuritic and Peripneumonic Diſeaſes.

BUT when a Courſe of the foregoing Kinds of Medicines hath been tried in vain, and the Diſeaſe, notwithſtanding all our Endeavours, ends in an Impoſthumation of the Lungs or Pleura; which may be known by the Obſtinacy of the Pain, an imperfect Expectoration, Cough, and the Fever laſting beyond the ſixth Day, with a Shivering often returning without any manifeſt Cauſe. And by conſidering the Time the Diſeaſe has laſted, we may know when it is perfected. The Matter is ſometimes evacuated by Expectoration. When an imperfect Expectoration has preceded, and, by the Symptoms, we find the Lungs oppreſſed, we may reaſonably conclude there is an Impoſthume, or a Collection of Matter, in the Subſtance of that Organ; and in theſe Caſes internal Medicines of the following Kind will be found very beneficial.

℞ *Gum. Ammon. Oliban. aa* ʒiij; *Aq. Pulegii ſimpl.* ℥vj; *M. f. Solutio. Deinde adde Sal. Diuretic.* ʒj; *Oxymel Scillit.* ℥j. *M. capiat Cochl.* iij *quarta quaque hora, ſuperbibend. Decoct. Pectorale* ℥iv.

We have ſeveral Times experienced the good Effects of theſe Medicines, in an Impoſthumation of the Lungs, which has ſucceeded this Diſeaſe; particularly in one Gentleman, who, after this Diſeaſe, attended with an imperfect Expectoration, had an Impoſthume of the Lungs; and with the Uſe of theſe, and a Courſe of Aſſes Milk, he diſcharged near a Quart of well digeſted Matter from that Organ; and was afterwards perfectly cured. Very often it will be obſerved, that the Pleura will be impoſthumated; which may be known by the following Symptoms, *viz.* a dry Cough, a Pain, and a Fever; a Weight or Heavineſs oppreſſing the Side where the Pain firſt attacked, and a ſharp or ſhooting Pain always reſiding in the ſame Place: The Patient has intenſe Thirſt, and eructates, or rejects warm Drinks, and cannot bear to lie upon the Side affected, but muſt lye only upon the oppoſite or ſound Side. When he lies down, the purulent Tumour gives him a heavy Senſation, as if it was a ſuſpended Weight; his Body alſo becomes much bloated, his Countenance fluſhed, and his Legs ſwell. The Part, which is afflicted with the acute Pain, and Heavineſs, being noted, muſt be pierced with Cauſtics; or an Inciſion muſt be made about as deep as the Pleura, and kept open with ſuppurating Medicines, that the Matter being thrown towards the

Outſide by the Power of the Lungs, may leave the Pleura whole, and ſo an Empyema may be prevented.

But when we find by the Symptoms that the Diſeaſe is what is commonly called a ſpurious or baſtard Pleuriſy, we muſt treat it very different from the former; for more than once bleeding, in theſe Caſes, would be very detrimental; but in its place ſhould be ſubſtituted the following Courſe of Medicines.

℞ *Mannæ* ℥j; *Juſcul. Avenac.* ℥ij; *M. deinde adde pul. Rhab. opt. Sal. Diuretic. aa* ℈j; *M. f. hauſt. Cathart. mane cum regimine ſumendus.*

℞ *Sperm. Ceti (in vitel. ov. ſol.)* ʒſs; *Aq. Alex. ſimpl.* ℥ij; *Spt. Nitri Dul. gut.* LX; *Elix. Paregoric.* ʒjſs; *Syr. Papav. errat.* ℥ſs. *M. f. hauſt. Anodyn. hora ſomni poſt cathart. ſumendus.*

℞ *Bezoar Min.* ʒſs; *Sal. vol. ſuccin. gutt.* vi; *Conſ. Fruct. Cynosb. q. ſ. M. f.*

bol. ſextâ quâque horâ ſumend. ſuperbibend. Cochl. vi. *Miſtura ſeq.*

℞ *Sperm. Ceti (in vitel. ov. ſol.)* ʒiij; *Decoct. Pectorale* ℔j; *Sal. Nitri*, ʒij; *Oxymel Scillit.* ℥iſs; *M.*

The pained Part ſhould be well fomented with an emollient Fomentation, and afterwards anointed with the volatile Liniment. But if, after three or four Days, theſe Medicines do not ſucceed, a large epiſpaſtic Plaiſter ſhould be laid on the Part affected; and if the Pain returns at Night (which is very often the Caſe) with a Reſtleſsneſs, the foregoing Anodyne ſhould be repeated every Evening. The Regimen ſhould be very light, of eaſy Digeſtion, and not flatulent; and if, at any Time of the Diſeaſe, the ſick Perſon ſhould be coſtive, a purging Clyſter, or the foregoing Cathartic ſhould be adminiſtered, to carry off the groſs Humours and Flatulencies, which are often very great in this Species of Pleuriſies.

CHAP. XIII.

Of the Peripneumony.

PROP. I.

To define the Nature and Cauſe of a Peripneumony.

WHEN there happens a real Inflammation in thoſe Veſſels of the Lungs which are capable of being affected therewith, as the Bronchial Arteries, thoſe of the ſofter Subſtance of that Organ, and the Lymphatics, which attend the ſame throughout; that Illneſs is called a genuine Peripneumony. If, from an acrid Defluxion falling on the Lungs, ſome of its minute Veſſels ſhould be inflamed; or if, from a heavy, viſcid, pituitous Matter, the capillary Veſſels of this Organ ſhould be obſtructed, and an Inflammation generated thereby; either of theſe may be called a ſpurious Peripneumony, or Peripneumonia Notha.

THE antecedent Cauſes of this Diſeaſe are various, *i. e.* any thing which increaſes the Quantity, Viſcidity, or Denſity of the Blood and Humours, or conſtringes the Veſſels of the Lungs; as a cold heavy Atmoſphere, aſtringent, or coagulating, Exhalations of Minerals, Salts, &c. The Chyle being too dry or viſcid, or having too great a Proportion of Acrimony. Violent Exerciſes of the Lungs, as in running, wreſtling, ſtriving, ſinging, or hallooing; hard riding againſt cold dry Winds. Poiſons or Medicines, which are coagulating or corroding, received into the Body; violent Paſſions of the Mind; a violent Pleuriſy, or an Inflammation of the Diaphragm. The immediate Cauſe of this Diſeaſe is an Inflammation of the Veſſels of the Lungs; which in the genuine Peripneumony is very great, and very often of the whole Lungs; but in the Peripneumonia Notha is only of the capillary Veſſels of this Organ.

PROP. II.

To point out the Effects of the different Species of this Diſeaſe upon the Human Body.

IMMEDIATELY after the Lungs are inflamed with a denſe ſizy Blood, as in the genuine Peripneumony, the Patient is attacked with a great Shivering, and a violent Rigour, which are ſoon ſucceeded by a burning Heat, with an acute Fever; a quick hot Reſpiration, Anxiety, Loſs of Strength, toſſing of the Body, and Pains about the Shoulder Blades, Clavicles, and Breaſt; a Difficulty of Breathing, with very great Oppreſſion and Load at the Breaſt; he lies on his Back a little more erect than ordinary, lying on his Side being uneaſy; and has a florid Redneſs of the Countenance; a ſhining of the Eyes; a ſmall Cough, with Blood, or frothy Spittle; a great Deſire of cold Air, and Drinks; a dry Mouth; a rough Tongue, at firſt whitiſh, afterwards red or black; a hard quick Pulſe, with continual Watchings; and a Groaning and diſturbed Sleep.

The Diſeaſe increaſing, a Sighing, with involuntary Tears, and a Bloatedneſs of the Neck and Face ſucceeds; as likewiſe a fixing of the Eyes; a cloudy Sight; a depraved Mind; a cold Numbneſs of the Joints, with Lividneſs: The Tongue becomes thicker, with a Sweating of the upper Parts; the Pulſe becomes weak and intermitting; and laſtly, there is a reſounding Noiſe of the Breaſt.

The ſpurious Peripneumony, or *Peripneumonia notha,* generally attacks old

People, and thoſe who have got Colds or Catarrhs; and it ſeizes, at firſt, unawares, with a flattering Lenity; for beginning with a ſmall Wearineſs, Lowneſs of Spirits, Difficulty of Breathing, and Oppreſſion of the Breaſt, it excites ſuch ſmall Motions, that the Signs of Heat or of a Fever ſcarce give any Uneaſineſs; preſently the Fever increaſes, with a Cough and Weakneſs; the Pulſe various, ſometimes quick and weak, ſometimes ſluggiſh and oppreſſed, never hard and tenſe, as in a genuine Peripneumony; when a Defluxion on the Lungs gives riſe to this Species, it is attended with more Cough, and the Humours are more thin and acrid.

PROP. III.

To point out the natural Termination of this Diſeaſe.

We may likewiſe obſerve of this as of all other Fevers, that it may terminate in

Health, Death, or another Diſeaſe; therefore we will, from the Violence of its Effects, endeavour to point out its natural termination. Firſt, then, this Diſeaſe terminates in Health by a benign Reſolution, or by diſſipating. If the Patient is not a Perſon of very rigid Fibres, which have been hardened by violent Exerciſe, but rather of thoſe which are ſoft and lax: If the Part affected be only bronchial, or but Part of the Subſtance of the Lungs: If after the firſt, ſecond, or third bleeding, the Patient begins to ſpit off freely a yellowiſh concocted Matter, lightly tinged with Blood, and of a reaſonable Thickneſs, by which he perceives his Pain to diminiſh, and his Breathing to come eaſier; and if it be not long before the expectorated Matter begins to be more concocted, and he ſpits ſmooth and white: If the Patient voids a great Quantity of turbid thick Urine, before the ſeventh Day, and is greatly eaſed thereby, the Sediment at firſt red, but whitening by Degrees; the Fever coming gentle, with a Breathing Sweat equally diffuſed all over his Body, or a few looſe Stools, with much Choler, or Matter reſembling the well concocted expectorated Matter juſt now deſcribed: All theſe denote the Diſeaſe will terminate in Health. But, if the Inflammation of the Lungs is very great, and the Patient is a Perſon of very ſtrong Fibres, which have been hardened by violent Exerciſe; if after the firſt, or ſecond bleeding, the Pulſe ſink very much, and he falls into great Tremours, Subſultus Tendinum, profuſe Sweats, or an atra-bilious Diarrhœa, with a Coma, or Delirium; if the Urine is well digeſted in the beginning of the Illneſs, but grows thin after the fourth Day; if, in the Height of the Illneſs, the Patient is obliged to be ſet upright; if a Looſeneſs with purulent

Matter comes on, which doth not give Eaſe; if the Peripneumony is of the dry Species, with a hot Ratling in the Throat, as if the Lungs were parched, with dropping of Blood from the Noſe, and red Spots over the Breaſt; which give us to know that the Inflammation has ſpread itſelf throughout; if a ſtrong Defluxion of ſharp Matter from the Head hath preceded, or doth follow; if, after the fifth Day, the expectorated Matter is bilious with Pus; if, from the beginning of the Diſeaſe, the expectorated Matter has been very bloody, of an entire yellow Colour, or very frothy, not allaying Pain; if this Matter is of a dark brown Colour, and filthy like the Lees of Oil, and the Fever is neither abated, nor the Breathing relieved: All theſe Symptoms declare the Termination of the Diſeaſe in Death.

The violent Symptoms being allayed by the Force of Nature, or the Aſſiſtance of Art, ſo as to put the Patient out of immediate Danger, but cannot be entirely eradicated, leaving ſome ſmall Part of the Lungs, or bronchial Veſſels, inflamed or ſuppurated, declare the Termination of this Diſeaſe in another Diſeaſe, *i. e.* in a Conſumption of the Lungs, or an Empyema, in which this doth very often terminate.

PROP. IV.

To point out the Method of relieving the various Species of this Diſeaſe, as far as Art is capable of relieving them.

THIS Diſeaſe, is ſo common, either as an original Malady, or conſequent to ſome other, that its Nature, Cauſes, and Method, ſhould be carefully ſtudied by every Practitioner; it being, for the moſt part, attended with great Danger, and requires a different Treatment in each of its different Species and Stages. For Inſtance, a Peripneumony ariſing from an Inflammation of the Lungs by a denſe ſizy Blood, is very different, and requires a different Method of Cure, from one depending on a thin acrid Defluxion on the Lungs; and likewiſe this Species ſhould be treated very different from that which owes its Riſe to an Obſtruction of the Lungs, from a heavy pituitous Matter. Therefore, as the Method of Cure in this Diſeaſe is very various, according to its different Species and Stages, we ſhall point out a Method of Cure for each of the Species we have taken notice of, and likewiſe for each of their different Stages.

In a genuine Peripneumony, ſpeedy, large, and repeated Bleeding is always abſolutely neceſſary to leſſen the Quantity and too rapid Motion of the Blood; yet great Regard muſt be had to the different Symptoms which attend it. For inſtance, if, in the beginning of the Diſeaſe, the Symptoms pronounce a great Inflammation of the Lungs, Bleeding is the only thing in Nature which can bring immediate Relief; and oftentimes we ſhall obſerve, after the firſt, ſecond, or third Bleeding, that the Patient will expectorate freely, a well concocted Matter tinged with Blood, and is eaſed thereby; then bleeding muſt be immediately avoided, otherwiſe this laudable Expectoration will be ſuppreſſed to the Patient's utter Ruin. But when the expectorated Matter is thin and crude, mixed with a conſiderable Quantity of thin, florid, frothy Blood, Bleeding is to be repeated, but with Caution, till the Matter ſpit off is more concocted. If, after the firſt Bleeding, which ſhould be large, the Symptoms are not relieved, but are rather aggravated, for Reaſons which ſhall be hereafter ſhewn, Bleeding muſt be repeated, at the Interval of eight or twelve Hours; more eſpecially if the Blood now appears like the Blood of Pleuretics, with a firm ſtrong Pulſe; then bleeding is to be repeated, till the Breathing begins to be more free and eaſy, or till the Craſſamentum of the Blood begins to be of a looſe Texture, and to loſe its ſizy Coat, or till the Blood comes thin, florid, and looſe, and gives off but a ſmall Quantity of Serum, after ſometime ſtanding; then we muſt omit Bleeding, and by other Methods endeavour to relieve the Patient.

THERE is a Train of Symptoms, which frequently happen, not only in the Beginning of this, but in the Beginning of all other inflammatory Diſeaſes; *viz.* an oppreſſed, irregular, ſluggiſh, and ſometimes intermitting Pulſe; the Patient at the ſame time complains of great Weakneſs, Oppreſſion, and Anxiety; and oftentimes there is a Coldneſs of the extreme Parts: all which Symptoms ſeem to contra-indicate bleeding. But when we conſider that this ſudden Dejection of Spirits,

rits, Loſs of Strength and Pulſe, cannot poſſibly ariſe from a Want of ſufficient Quantity of Fluids, or from their being grown already ſo viſcid, that they cannot circulate, as the Diſeaſe has been of ſo ſhort a Duration; but from too great a Quantity, which over-loads the containing Veſſels, and thereby gives riſe to all thoſe Symptoms. For when the Fibres which compoſe the Veſſels, are, by too great a Quantity of the contained Fluids, diſtended beyond their natural Tone, they cannot contract themſelves ſo as to give a proper Degree of Velocity to the Fluids, to enable them to perform their Secretions, and prevent their falling into Coheſions, Viſcidity, and Tendency to Stagnation. Hence ſoon follows an Oppreſſion, a Dejection of Spirits, and a Coldneſs in the extreme Parts; for want of a due Circulation, and a proper Secretion of the Juices; which is ſoon followed by Death itſelf; except the increaſed Quantity of the Fluids is evacuated, and the Equilibrium, between the containing Veſſels and the contained Fluids, is again reſtored; which takes off the Oppreſſion of the Fibres, and enables them to return to their former Contractions, and the muſcular Canals to exert their Force, to give a due Degree of Velocity to the viſcid and denſe Juices, and render them more fit to perform their Secretions; which will ſoon invigorate the Action of the Heart, and of the other Veſſels, and allay thoſe violent Symptoms: So that in theſe Caſes bleeding is ſo far from weakening the Patient, that it is the only Remedy left to ſecure him from Death. We have, ſeveral Times, been called to Perſons labouring under all theſe violent Symptoms, *i. e.* Anxiety Oppreſſion, on the Breaſt, a Coldneſs in the extreme Parts, great Weakneſs, ſometimes with a Coma; the Pulſe ſcarce perceivable and intermitting; for which we always order a large bleeding, and immediately after the Operation the Pulſe hath begun to riſe, the Oppreſſion and Anxiety to abate, and a great Heat to diffuſe itſelf all over the Body; after which the Patient is, as it were, reſtored from Death to Life. But to return to our ſubject, during the Time of bleeding, and through the whole Courſe of the Diſeaſe, it will be neceſſary for the Patient to draw in the Steams of warm Water, wherein have been boiled emollient Herbs, Roots, and Seeds, to his Lungs; his Legs and Feet ſhould be well fomented with the ſame emollient Fotus, and afterward a large Veſicatory ſhould be applied to each Leg, which will be found of ſingular Service; his Drinks ſhould be cooling, relaxing, and gently ſaponaceous, ſuch as thin Whey, a Ptiſan of Barley with Liquorice and Figs, Infuſions of Pectoral Herbs and Roots. Honey boiled with Water and

Vinegar, will be found an excellent Drink in theſe Caſes; but we ſhould obſerve that all his pectoral Drinks ſhould be gently acidulated with the Juice of Seville Oranges or Lemons. His Belly, which is generally bound, ſhould be fomented with an emollient Fotus, and a gentle laxative Clyſter ſhould be injected, to evacuate the groſs Excrements and Flatulencies; but great Care muſt be taken not to bring on a Diarrhœa, which will always be attended with dangerous Conſequences, by ſuppreſſing the Expectoration without relieving the Diſeaſe: for it will always be obſerved that when there is a great Flux of Humours downward, the ſuperior Parts grow dry, the ſpitting ceaſes, and Death ſoon cloſes the Scene: So that, in theſe Diſeaſes, we ſhould be very careful not to let the Body be too coſtive, which will always increaſe the Fever, nor too looſe leſt it ſhould ſuppreſs the Expectoration.

After bleeding and the Uſe of the foregoing external Medicines, a Courſe of the following Internals ſhould be uſed to cool, dilute, and thin the remaining Maſs of Fluids, and prevent an Increaſe of the inflammatory Lentor.

℞ *Sperm. Ceti (in vitel. ov. ſol.)* ʒj; *Aq. Alex. ſimpl.* ℥ij; *Sal. Nitri* ℈j; *Sp. Sal. Am.* *gt.* xxx; *Oxymel. Scillit.* ʒij; *Syr. Balſ.* ʒiij; *M. f. hauſt. tertia quaque hora ſumend. ſuperbibend. hauſt. Aq. Hord. vel Decoct. Pector.*

℞ *Ol. Amygd. dul.* ℥j; *vitel. ov.* N°. j; *M. deinde adde Elix. Paregoric.* ʒj; *Aq. Pulegii* ℥j; *Sp. Nitri Dul. gt.* LX; *Diacodium* ʒiij; *M. f. hauſt. anodyn. omni nocte hora ſomni ſumend.*

This Draught will be found to be of great Service in allaying the Cough, and at the ſame time rather promotes than leſſens the Quantity of the expectorated Matter. The ſick Perſon ſhould be kept as quiet as poſſible, carefully avoiding all the

Paſſions of the Mind, and Exerciſes of the Body. The Air ſhould be cold and clear, as there is an abſolute Neceſſity, when the Lungs are inflamed or obſtructed, for the ſick Perſon to breathe a cold clear Air; but then the Steams of an emollient Fotus ſhould be drawn in with the Breath at proper Intervals, leſt the Extremities of the Pulmonary Veſſels ſhould be conſtringed, and the Quantity of the expectorated Matter leſſened. The Patient's Drinks ſhould be adminiſtered in ſmall Quantities, but often repeated, and as hot as he can bear; for cold Drinks are very prejudicial in this Diſeaſe.

When the Bliſters, applied to the Legs in this Diſeaſe, do ulcerate, they generally give great Relief; but great Care muſt be taken that the Diſcharge from them is not too ſuddenly ſuppreſſed; for very frequently after this, not only the Cough and Difficulty of Breathing will be found to return, but likewiſe a colliquative Diarrhœa, with Night Sweats, and other Symptoms of a Hectic; which will frequently end in Death.

If, notwithſtanding all our Endeavours, the Diſeaſe ſtill increaſes, and the Symptoms declare an Impoſthume formed in the Lungs, all poſſible Means muſt be uſed to break it immediately, and to make a Diſcharge thereof through the Windpipe; and afterwards we muſt adminiſter ſome ſuch Medicines as will heal the Parts, before they can acquire any Degree of Foulneſs, or ulcerate. The Impoſthume may be broken by, firſt, preparing the Body with a ſufficient Quantity of ſoft Food, fat Broths, and oleous Medicines; afterwards directing toward the Lungs the Steams of hot Vinegar, Wine, or Euphorbium; cauſing the Patient to halloo, cough, or to be jolted in a Coach or Cart. Some ſuch Medicines as the following will be found to be very good in theſe Cauſes.

℞ *Gum Ammon.* ℨj; *Aq. Pulegii* ℥vj; *f. ſolutio cui adde Oxymel. ſcillit.* ℥ij; *M. f. miſtura. Capiat cochl.* iij; *quarta quaque hora.*

During the Uſe of theſe Medicines, the Patient ſhould drink freely of warm Broths, made very fat, and uſe gentle Exerciſe.

As ſoon as we find the Impoſthume is broken, the Patient ſhould be immediately put on a Courſe of Aſſes Milk, with a Diet of the ſofteſt vegetable Food; he ſhould conſtantly uſe the ſoft Steams beforementioned, and gentle Exerciſe, the chief of which ſhould be riding on Horſeback, or in a Coach; and theſe ſhould be continued ſometime, with the Uſe of Medicines of the following Kind.

℞ *Sal Nitri gt* x; *Balſ. Gilead. gt.* xv; *Conſ. Roſ. Rub. q. ſ. M. f. Bol. ter in die ſumend. ſuperbibend. Cochl.* iv. *Miſturæ ſeq.*

℞ *Decoct. Pectorale,* ℥viij; *Flores Benzoin.* ℨſs; *Oxymel Scillit.* ℥j; *M.*

In the ſecond Species, or Peripneumonia notha, we muſt proceed in a different Manner to relieve the Patient; and not becauſe it has the Name of Peripneumony, proceed in the Cure by repeated Bleedings, although the Load and Oppreſſion at the Breaſt may be very urgent; but conſider the low, weak, Pulſe, the pale and crude Urine, and the Heat little above what is natural. When Blood is drawn from a Patient labouring under this Species, it has not that viſcid Buff, as in the genuine Peripneumony; but it appears of a darkiſh livid Hue. Although, in the general, more or leſs Blood ſhould be drawn in the Beginning of the Illneſs, to take off the Load and Diſtenſion of the Veſſels, that the Medicines which are adminiſtered may act with more force, in taking off the Viſcidity of the remaining Maſs of Fluids: But a Repetition of this Evacuation is very dangerous. After bleeding, if the Patient has any Sickneſs at Stomach, or urging to vomit, a gentle Emetic of the following kind, ſhould be immediately exhibited.

℞ *Pul. Ipecacaanhæ gr.* xv; *Oxymel ſcillit.* ℥j; *Aq. Flor. Sambuc.* ʒvi; *M. f. hauſt. emetic.*

THIS will not only relieve the Stomach and Lungs of the viſcid Matter which adheres to them, but will alſo, by the Concuſſion it gives to the whole Body, promote a general Attenuation and Fluxibility of the Maſs of Fluids. But when the Pain at the Stomach and Urgings are not violent, in the Room of a Vomit, a gentle Cathartic ſhould be exhibited; afterwards the Patient ſhould be put under a Courſe of the following Kind of Medicines.

℞ *Camph. gr.* iv; *Bezoar. min.* ℈j; *Sal. vol. ſuccin. gt.* vj; *Conſ. Fruct. Cynoſb. q. ſ. M. f. Bol. ſextâ quâque horâ ſumend. ſuperbibend. hauſt. ſeq.*

℞ *Sperm. Ceti (in vitel. ov. ſol.)* ʒſs; *Sal. Nitri gr.* xii; *Sp. Sal. vol. Aromat. gtt.* LX; *Aq. Alex. ſimpl.* ℥ij; *Oxymel ſcillit.* ʒij; *M. f. hauſt.*

BLISTERING Plaiſters applied in this Species of the Diſeaſe are of ſingular Service, as they not only drain off a great Quantity of morbid Humours, but, by their attenuating and ſtimulating Quality, are of great Service in diſſolving the Coheſion and Viſcidity of the Fluids; three or four ſhould be applied to the Legs and Thighs, and a very large one to the Neck: the Parts ſhould be well rubbed before the Bliſters are laid on, as it will be found to promote their riſing, and conſequently their Diſcharge. The Patient's Drinks ſhould be of the mild, attenuating, ſaponaceous Kind; as the pectoral Decoction, Infuſion of Penny-royal, Hyſop, Ground-ivy, or Elecampane, ſweetned with Honey, and acidulated with Sp. Sulph. or

Juice of Lemons. His Diet ſhould be thin Broths, Water-Gruel, Panada, &c. If, after three or four Days, the comatoſe Symptoms, and a very difficult Reſpiration remain, notwithſtanding Bleeding and a Courſe of the foregoing Medicines have been ordered, more Bliſters ſhould be applied, and a Courſe of Medicines of the following Kind entered on immediately.

℞ *Bezoar. Min.* ℈j; *Sal. vol. Succin. gr.* x; *Camph. gr.* vj; *Conſ. fruc. Cynoſb. q. ſ. M. f. bol. quarta quaque hora ſumend. ſuperbibend. hauſt. ſeq.*

℞ *Sal. vol. c. c. gr.* x; *Suc. Limon.* ʒiij; *M. deinde adde Aq. Alex. Simpl.* ℥iſs; *Oxymel Scillit. Tinct. Croci aa* ʒj; *M. f. hauſt.* But even here, theſe Medicines muſt be increaſed, or decreaſed, in Quantity, according as the different Degrees of Heat, and Difficulty of Breathing, the State of the Fluids, and other concomitant Symptoms ſhall determine.

In the third Species which we have taken Notice of, or, if we may uſe the term, the Catarrhal Peripneumony, it is neceſſary we ſhould begin the Cure with bleeding; to allay the inflammatory Symptoms already preſent, and to ſecure the Body from future ill Accidents. Immediately after bleeding, a large Bliſter ſhould be applied to the Neck, and two to the Legs, to draw off the acrid Defluxion from the Lungs; and ſome emollient pectoral Ptiſan, or Mixture, ſhould be adminiſtered, to temperate the Acrimony of the Humours, and promote Expectoration. The next Day it will be neceſſary to adminiſter a gentle Cathartic, of the following kind, which ſhould be repeated, except there is a laudable concocted Expectoration.

℞ *Mannæ* ʒvj; *Juſcul. avenac.* ℥ij; *M. f. Solutio*; *Deinde adde Pul. Rhab. Sal.*

Diuretic. aa. ℈j; *M. f. hauſt. cathartic. mane cum regimine ſumend.*

Afterwards the following Kind of Medicines ſhould be exhibited during the Courſe of the Diſeaſe, increaſing or decreaſing the Quantity, as the Symptoms, and Strength of the Patient ſhall indicate.

℞ *Bezoar. Min.* ℈j; *Conſ. Roſ. Rub. q. ſ. M. f. bol. quarta quaque hora ſumend. ſuperbibend. hauſt. ſeq.*

℞ *Decoct. Pectorale* ℥iſs; *Gum. Oliban.* ℈j; *M. f. Solutio. deinde adde Elix. Paregoric.* ʒj; *Sp. Nitri Dul. gtt.* L; *Syr. Balſ.* ℥ſs; *M. f. hauſt.*

If the Cough is violent at Night, as is frequently the Caſe, the following pectoral Draught will be found to be inferior to no Medicine the Materia Medica furniſhes us with, for allaying that Symptom.

℞ *Sperm. Ceti (in q. ſ. mucilag. Gum. Arabic. Diſſol.)* ʒj; *Decoct. Pectorale* ℥ij; *Sp. Nitri. Dul. gtt.* LX; *Balſ. Traumatic. gtt.*

gtt. L; *Diacodium* ℥j; *M. f. hauſt. omni nocte hora ſomni ſumend. ſi tuſſis urgeat.*

The Patient's Drinks, in this Species, ſhould be Water-Gruel ſweetened with Honey, and acidulated with the Juice of a Seville Orange or Lemon, pectoral Decoctions or Infuſions, or Coffee, which is very much recommended by ſeveral Phyſicians. His Diet ſhould be thickening Broths, Sago, &c. carefully avoiding all Kinds of Meat which ſtimulate, or increaſe the Heat and Acrimony of the Humours.

CHAP. XIV.

Of the Putrid Peripneumony.

PROP. I.

To define the Nature and Cauſe of this Diſeaſe.

THE putrid Peripneumony is a Diſeaſe of a very dangerous Nature, which hath raged frequently in this and the neighbouring Kingdoms for theſe Thirty Years paſt; and, as far as we have obſerved, hath not been treated of by any of the phyſical Writers: Therefore we ſhall, from the Obſervations we have made, during our Practice, endeavour to point out its true Cauſes, Effects, and Method of Cure.

This Diſeaſe generally attacks Perſons of an Ill-Habit of Body, where a Cacochymy abounds; thoſe who are ſcorbutic, or have been fed, for ſome time, on very ſalt or putrid Meats, or have drunk corrupt or putrid Fluids; eſpecially ſeafaring Perſons, and thoſe who have been fed in Priſons or Jails; where the Air is likewiſe fully impregnated with a putrid Effluvia; which, being drawn into the Lungs, aſſiſts to deſtroy the Texture of the Blood, and make it a corrupt Maſs of putrid Matter. The immediate Cauſe of this Diſeaſe is a Diſſolution of the Blood-globules, and an Inflammation of the Lungs the Conſequence thereof; for when the Texture of the Blood is diſſolved, it is rendered capable of entering into all the minute Veſſels of the Body, whoſe Diameters exceed the Diameters of the Particles of the diſſolved Matter; and conſequently as the Lungs are replete with

Veſſels, and the whole diſſolved Maſs of Blood muſt paſs through their Subſtance, a great Quantity of this diſſolved Maſs will be forced into their minute Veſſels, by which Obſtructions, an Inflammation will be generated; and this Diſeaſe will be the Conſequence thereof.

PROP. II.

To point out the Effects of this Diſeaſe.

IMMEDIATELY after the capillary Veſſels of the Lungs begin to be obſtructed with this diſſolved Matter, the Patient finds himſelf ſhort breathed, liſtleſs, and faint on the leaſt Motion; but as ſoon as an Inflammation is generated, the foregoing Symptoms increaſe, with Heats and wandering Pains all over his Body, like a Rheumatiſm. A Fever follows with a great Load at the Breaſt and Anxiety; his Pulſe is very quick and ſmall, with a dry Cough, unequal Sweats, and a perpetual Reſtleſsneſs; after two or three Days he begins to expectorate a thin, bloody, or very dark coloured Matter, of a very offenſive ſmell, and very often a brown or livid Petechiæ will appear about the fifth or ſixth Day; his Urine is frequently of a dark brown, or of a fiery Colour, as if mixed with Blood; is voided in ſmall Quantities, and without any Manner of Sediment; his Tongue is black and very foul, and the Blood drawn from him is in a diſſolving, putrid, State; the globular Part looſe, the ſerous Part turbid and reddiſh. Immediately after the Patient is blooded, he falls into great Anxiety, Faintneſs, Loſs of Strength, cold Sweats, and has an intermitting Pulſe; although, before, his Pulſe was ſtrong and hard, and the Fever high. About the ſixth or ſeventh Day he is generally attacked with an Hæmorrhage, or a bloody

Dyſentery, which is ſoon followed with a Train of very diſmal Symptoms, and, without ſpeedy Relief, Death ſoon cloſes the Scene. This Diſeaſe, without the Aſſiſtance of Art, will always terminate in Death; therefore whatever Hopes the ſick Perſon muſt have, muſt ariſe from the prudent Adminiſtration of Medicines ſuitable to the Nature of his Diſeaſe; which we ſhall treat of in the next Propoſition.

PROP. III.

To point out the Method of relieving this Diſeaſe, as far as it is within the Power of Medicine to do it, or as far as it is capable of being relieved.

The Method of relieving a putrid Peripneumony is very different from the Method of relieving the former Species we have taken Notice of; Bleeding muſt now be very cautiouſly uſed, eſpecially if the

Pulſe is low and quick, with unequal Sweats; although the Cough and Load at the Breaſt ſeem to indicate it: but when, in the Beginning of the Diſeaſe, the Pulſe is ſtrong and throbbing, and the Fever runs very high, bleeding is very neceſſary; and afterward the Patient ſhould be put on a Courſe of Medicines of the following kind: becauſe if we bleed a ſecond Time in this Diſeaſe, Death muſt be the Conſequence.

℞ *Bezoar. Min.* ʒſs; *Conſ. Roſ. Rub. q. ſ. M. f. bol. quarta quaque hora ſumend. ſuperbibend. hauſt. ſeq.*

℞ *Decoct. Cort. Peruv.* ℥ij; *Gum. Oliban.* ℈j; *M. f. ſolutio. Deinde adde Sal. Nitri* ℈j; *Syr. e Limon.* ℥ſs; *M.*

MANY Phyſicians would be very cautious in giving any Preparation of the *Cortex Peruv.* in this Diſeaſe, becauſe of the Oppreſſion at the Breaſt, and beginning Inflammation of the Lungs, and would, in its Place, order ſome emollient Medicines to relax the Veſſels, and promote Expectoration; but theſe Phyſicians muſt give us leave to obſerve, that that Method is prejudicial in the Beginning of the Diſeaſe, and indeed throughout its whole Courſe, except cautiouſly uſed; for (laying aſide Experience) let us but only conſider, that this Inflammation is generated by a diſſolved State of the Blood, and conſequently whatever diſſolves the Blood yet more, or relaxes the Veſſels, ſo as to enlarge their Diameters, will increaſe the Inflammation; which a Quantity of emollient Medicines are known to do; and, on the other hand, whatever ſtrengthens the Texture of the Maſs of Fluids, muſt decreaſe the Inflammation, by rendering them incapable of entering into theſe minute Veſſels; which Preparations of the *Cortex Peruv.* are known to do; and as the Preparation I have ordered in theſe Caſes, is guarded with Diaphoretics and

Diuretics, it cannot poſſibly produce any ill Effects, but, on the contrary, will be found to be the beſt Medicine the Materia Medica furniſhes us with; by ſtrengthening the Texture of the Maſs of Fluids, which now tends to a State of Diſſolution and Putrefaction. During the Uſe of theſe Medicines we generally order the following pectoral Medicine to be drunk warm, to promote Expectoration when deficient.

℞ *Decoct. Pectorale* ℔j; *Succ. Limon.* ℥iſs; *Tinct. Roſar, Oxymel ſcillit. aa.* ℥ij; *M. capiat cochl.* iv. *omni hora.*

VERY often the Cough rages with great Violence at Night, which is very prejudicial to the Patient; to allay which Symptom we generally order *Elix. Paregoric.* ʒj *vel* ʒiſs to be taken in a Draught of the pectoral Decoction. All the Patient's Drinks ſhould be warm, as they are much better for promoting Expectoration. Wine and Water acidulated with the Juice of Seville Oranges or Lemons, will here be found a good Drink: ſometimes it will be found neceſſary to add *Oxymel Scilliticum* to this Drink, to pump up the Matter, eſpecially when the Difficulty of Breathing, and great Rattling in the Windpipe, pronounces a great Quantity of it in the Lungs. The Patient's Diet ſhould be Jellies, Sago, thick Gruels, &c. and all theſe mixed with the Juice of Lemons and Wine. Red-Port Wine mulled up with Cinnamon or Mace, and well acidulated with the Juice of Oranges or Lemons, with a Toaſt, will be found very beneficial in this Diſeaſe.

BLISTERING and Purging in this Caſe are very prejudicial, the former being frequently attended with an Ulceration or Mortification of the Part, and the latter always ſucceeded with a Dyſentery or an obſtinate Diarrhœa. About the eighth

Day, ſometimes ſooner, we may expect a Criſis; but it will be generally an imperfect one, or a Tranſlation of the morbid Matter on ſome other Part of the Body. When it is perfect, the Diſeaſe generally goes off with a large fœtid Sweat, or a great Quantity of thick turbid Urine. At this time, we muſt uſe our utmoſt Endeavours to relieve Nature, by ſtrong Pectorals, Corroboratives, Diaphoretics, and Diuretics. In this State we generally omit the foregoing Medicines and adminiſter ſome of the following Kind.

℞ *Bezoar min.* ʒſs; *Coccinel gr.* iv; *Pul. Contrayervæ Com.* ℈j; *Conſ. Roſ. Rub. q. ſ. M. f. bol. quarta quaque hora ſumend. ſuperbibend. hauſt. ſeq.*

℞ *Decoct. Cort. Peruv.* ℥ij; *Sal. Succin.* ℈j; *Syr. è Limon.* ℥ſs; *M. f. hauſt.*

AFTER this Diſeaſe has performed its Criſis, it will be neceſſary to order two or three Purges of Rhubarb, or ſome other gentle Cathartic, to carry off the putrid Matter, which has been thrown on the Inteſtines; afterwards the Patient ſhould immediately go under a Courſe of Aſſes Milk, and the *Cortex Peruv.* with gentle Exerciſe, eſpecially Horſe-Riding, and this in a fine Country Air; otherwiſe he will be in great Danger of a Conſumption which very frequently follows this Diſeaſe.

FINIS.

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